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NEW ENGLAND SURGICAL SOCIETY

FIBROMYOMATA OF THE UTERUS COMPLICATING PREGNANCY*

BY RICHARD S. BENNER, M.D.†

I HAVE chosen this subject for my paper feeling that the condition of fibromyomata which we so frequently meet in our office and hospital routine is of vital interest not only to the obstetrician but the surgeon as well. Although my list of 18 cases does not give an opportunity for so extensive a study as the series reported from the large clinics, it does bring out something of interest. My list includes only tumors large enough or in a position to cause complications; small fibroids are very common in the pregnant uterus, and are usually symptomless, disappearing after involution following childbirth.

Fibroid tumors are classified in various ways: pedunculated, subperitoneal, interstitial, intraligamentous, submucous and pelvic. A simpler classification would be according to the treatment indicated, i.e., 1, interstitial or subperitoneal, 2, submucous, 3, pelvic. For convenience, I will discuss the subject under the following divisions:

1.) Frequency of fibroids in pregnancy
2.) Fibroids as a cause of sterility
3.) The effect of fibroids on pregnancy
4.) Effect of fibroids on labor and the puerperium.

FREQUENCY OF FIBROIDS IN PREGNANCY

It is difficult to determine the frequency of fibroids in pregnancy, for small fibroids are so commonly encountered that no note is made of them. Pierson of New York found 250 cases in 30,863 patients at the Sloane Hospital—191 of sufficient clinical importance to require careful observation. Craigin reported 20,000 cases for this same clinic, 89 of which had noticeable myomata. Polack reports 7,000 obstetric cases, 60 of which had fibromata large enough to cause anxiety, and 4 demanded section during labor to accomplish delivery. This is about the proportion I have found in the last 8 years in my own private practice—18 cases in 1,600.

*Read at the Annual Meeting of the New England Surgical Society, Boston, September 27, 1930.

†Benner—Secretary, Executive Committee, Wesson Maternity Hospital, Springfield. For record and address of author see "This Week's Issue", page 795.

FIBROIDS AS A CAUSE FOR STERILITY

Fibroids undoubtedly are a factor in sterility either by interfering with conception or by causing an early termination of pregnancy. Polack states that 1/3 of all women who have fibroids are sterile while Craigin reports a 25% sterility. It is difficult to determine by statistics to what degree fertility is affected by fibroids, as fibromyomata large enough to bring the patient to the surgeon are not frequently found previous to the age of 35—a time in life when fertility decreases.

In my series of 18 patients, the average age at which pregnancy occurred was 37, 11 of them primigravida who had become pregnant 1-11 years after marriage. One patient 43 years of age with a large fibroid became pregnant after 14 years of sterility following the birth of her first child.

The most important factor in determining the part played by fibroids in causing sterility is the location of the fibroid. Whereas a submucous or interstitial fibroid might cause sterility by interfering with the implantation of the ovum or abortion or miscarriage by its pressure and irritative action inside the uterus, a large subperitoneal fibroid may cause very little trouble so far as the uterus is concerned. Small fibroids in the neighborhood of the tubes may cause congestion, obstruction and other pathological conditions in the tubes preventing conception.

EFFECT OF FIBROIDS ON PREGNANCY

Fibroids as a cause of abortion and premature labor give us a high percentage according to statistics. Craigin and Ryder report 25%, Polack gives 21%. In my series, there were 3 patients with large multiple fibroids, 2 pregnancies terminated at the 5th month and one at the 8th month. These three patients who all had large fibroids suffered a great deal of pain over the tumor during pregnancy. In considering the effect of fibroids on the course of pregnancy, importance must again be given to the location of the fibroid. A small submucous fibroid may cause an early abortion, and a large subperitoneal fibroid may have no effect on either pregnancy or labor.

It has been most amazing to me that large fibroids have so little effect in pregnancy. The only fibroid which I had occasion to operate upon during pregnancy was in a patient of 36, pregnant for the first time after several years of married life. The fibroid was in the right inguinal region in such a position that the attending physician diagnosed a strangulated hernia and attempted to reduce it. The symptoms were extreme pain, nausea and vomiting. I found an inflamed pedunculated fibroid which was easily removed without interfering with pregnancy. Since then, I have seen a much larger fibroid apparently pedunculated causing similar symptoms. Operation was advised but refused by the patient who is still going on with the pregnancy with only an occasional attack of pain. I doubt whether an operation is often necessary even in the presence of the above-mentioned symptoms.

Occasionally a fibroid may be discovered early in pregnancy so large that a full-term pregnancy would be impossible. One such case occurred in my list. The fibroid was removed by myomectomy at the third month, and the patient went to full term giving birth to a living child.

Now that myomectomy has become a more popular operation, it is occasionally performed in pregnancy when the fibroid is very troublesome and the operation does not usually interfere with the course of pregnancy. Myomectomy during pregnancy may be performed on account of degeneration, torsion, impaction or large size of the fibroid, but indications calling for this operation do not occur very often.

Name	Age	Para	Fibroid, Size and Kind	Preg.	Deliv.	Conval.	Con. baby
W. J. K.	38	1	Mult. interstit.	Normal	Easy breech	Normal	Living
E. C. W.	44	1	Mult. interstit.	Normal	Easy rapid	Normal	Living
C. A. B.	44	2	Large, interstit., mult.	Normal	Easy low for.	Normal	Living
S. S.	32	2	Pedunc. pelvic	Normal	Normal	Normal	Living
F. S.	42	1	Mult. interstit.	Normal	Caes. and hyster.	Normal	Living
F. E. N.	37	1	Mult. interstit.	Consid. pain	8th mo. normal	Normal	Macerated
M. J. W.	39	1	Pelvic	Normal	Caesarean	Normal	Living
J. R.	38	1	Mult. interstit.	Normal	Long, diff.	Normal	Living
J. C.	45	1	Pelvic, pedunc.	Normal	Caes. and hyster.	Stormy Perito-nitis	Macerated
L. H.	35	1	Pedunc.	Pain Myomect. at 7th mo.	Diff. labor Caes.	Phlebitis	Living
D. W. B.	41	5	Moderate	Normal	Normal	Normal	Living
A. W.	32	1	Mult.	Miscarried 5th mo. Later hysterec-tomy			
S. G.	23	1	Large	Myomec-tomy	Normal	Normal	Living
E. C.	42	1	Myomect. for submucous fibroid—preg. 1 yr. later	Normal	Version	Normal	Living
I. O.	28	2	Large, interstit. Refused op.	Normal	Normal	Normal	Living
D. S.	30	2	Large, pedunc.	Marked pain	Undelivered		
H. V.	37	2	Mult. interstit.	Great discom.	Mis. 5 mos.	Hyster. later	
C. F.	41	1	Pedunc. interstit.	Myomect. at 3 mos. followed by mis.		Stormy conval.	

EFFECT OF FIBROIDS ON LABOR AND THE PUERPERIUM

Fibromyomata except those in the pelvis have not had a serious effect on labor in my experience. Statistics from the larger clinics show that interstitial fibromyomata interfere with normal uterine contractions, causing inertia, a tendency to postpartum hemorrhage, an increase of abnormal positions of the fetus at term and an early rupture of the membranes. These statements are undoubtedly true but these difficulties are frequently met in the elderly primipara whether a fibroid is present or not.

In Craigin's series of 89 cases, there were 21 cases of postpartum hemorrhage or unusual uterine inertia. Caesarean is always to be considered in the fibroid uterus especially if the

fibroid is in the pelvis. It is surprising how well many of these patients do in labor if treated conservatively. One of my patients, a primipara of 42 with multiple fibroids came to me in her last month of pregnancy. She had been advised by a surgeon in another city to have an elective Caesarean and hysterectomy. This patient was allowed to go into labor which lasted a few hours and was normal in every respect.

In my series, one pelvic fibroid retracted from the pelvis as the labor went on so that the patient had a fairly easy delivery. This is the history in many cases. On the other hand, a primipara of 42 with a fibroid partially filling the pelvis was given a test of labor. As no progress was made in dilatation or retraction of the fibroid, a Caesarean was performed. The fibroid which was situated in the broad ligament was not removed as it seemed too dangerous at the time to perform a myomectomy on the tumor in this position.

One patient, a primipara of 42 with a fairly large fibroid at the fundus had an elective Caesarean and hysterectomy performed at her request as she did not wish to take any chance of losing her baby. This particular fibroid showed marked softening and degeneration in its center although there had been no symptoms from the fibroid during pregnancy.

In my series was another case of pedunculated pelvic fibroid, a primipara of 40 whom I saw in consultation. The patient was in labor, partly dilated, with membranes ruptured and a dead baby. As the fibroid could not be displaced from the pelvis, a Porro Caesarean was performed. The patient had a stormy convalescence on account of peritonitis. The question arose afterward whether a myomectomy, and delivery from below by craniotomy would not have saved this patient her serious illness.

Statistics of the larger clinics show that women with fibromyomata go through their pregnancies and repeated pregnancies without much difficulty. Interruption of pregnancy on this account is seldom justifiable. If any operation is necessary, a myomectomy is to be preferred to hysterectomy.

In conclusion:

1.) Statistics show that slightly less than 1% of all pregnant women have fibroids large enough to be of importance.

2.) Fibroids are frequently the cause of sterility although pregnancy often results even late in reproductive life.

3.) Fibroids as a rule do not often cause severe complications during pregnancy even when they are of very large size.

4.) Pedunculated fibroids interfere but little with labor and delivery, but interstitial fibroids may be a cause of inertia and postpartum hemorrhage. A Caesarean with myomectomy or hysterectomy is indicated in some cases especially when the fibroid is in a position to cause obstruction.

5.) The treatment of fibroids both in pregnancy and labor should be conservative.

WEEKLY HEALTH INDEX

Telegraphic returns from 78 cities with a total population of thirty-five million for the week ending October 4, indicate a mortality rate of 10.0 as against a rate of 10.8 for the corresponding week of last year. The highest rate (18.1) appears for Nashville, Tenn., and the lowest (6.2) for Grand Rapids, Mich. The highest infant mortality rate (14.5) appears for Wilmington, Del., and the lowest for Bridgeport, Conn., Fall River, Mass., New Bedford, Mass., and Salt Lake City, Utah, which reported no infant mortality.

The annual rate for 78 cities is 12.0 for the forty weeks of 1930, as against a rate of 12.8 for the corresponding weeks of 1929.

The rates published in this summary are based upon midyear population estimates derived from the 1930 census. Cities whose population was found to be less than was indicated by estimates heretofore used will therefore appear as having a higher death rate than usual, even though there may have been no material increase in the actual number of deaths. —*Department of Commerce.*

AN HONORARY DEGREE CONFERRED ON DR. WILLIAM J. MAYO

In recognition of his services to humanity in the field of surgery, Dr. Charles E. Beury, president of Temple University, on October 15, 1930, conferred upon Dr. William J. Mayo, chief of staff of the Mayo Clinic at Rochester, Minn., the honorary degree of Doctor of Laws.

Dr. Mayo delivered the dedicatory address at the formal opening of Temple's new $1,500,000 School of Medicine. The event took place during the sessions of the 20th Clinical Congress of Surgeons, which convened in Philadelphia on October 13.

Invitations to join in the tribute to Dr. Mayo were sent by Dr. William N. Parkinson, dean of Temple's medical school, to 4,000 leaders in medicine and surgery throughout the country.

Dr. Mayo was presented for the honorary award by Dr. Wayne Babcock, of the surgical staff of the Temple School of Medicine, and the honor was conferred personally by Dr. Beury. An official civic aspect was given the occasion by the presence of Mayor Mackey and his cabinet, while leaders in the civic, educational, business and professional life of this city were invited to participate.

THE VALUE AND LIMITATIONS OF SPINAL ANESTHESIA

BY JOHN B. DEAVER, M.D.,* AND JOHN C. ECKELS, M.D.*

THE progressive surgeon is ever on the outlook for the ideal anesthetic. Whether this will be discovered remains to be seen. We believe that from a practical viewpoint spinal or lumbar anesthesia, or subarachnoid block, has been sufficiently tested to deserve a place among present-day anesthetics.

In a previous publication[1] 2,251 cases of spinal anesthesia with the use of Apothesin, covering the three-year period from March 1924 to March 1927 was reported from this clinic. We now supplement that report by presenting our results in 2,302 cases of spinal anesthesia since that time.

While the continued use of spinal anesthesia in an increasing percentage of cases bespeaks our faith in its safety, its ease of administration, and its efficacy, our object at this time is not to advocate the routine use of this anesthetic or to advance any theories as to its benefits or safety, but rather to present our experiences as a contribution to the important question of surgical anesthesia.

The main points to be considered are: Is spinal anesthesia of benefit to the patient? Is it practical for the surgeon? What are the indications for and against its use?

In order that one may better gain an idea of the conditions under which spinal anesthesia is used in this clinic, a brief picture of an average operating day may not be amiss.

The anesthetic is administered by the junior surgical intern, who has been required to practice lumbar puncture on the cadaver and who also has had some experience in doing lumbar punctures on patients while on the medical service. In view of the fact that this means training a new man every three months, much stress is laid on the dictum: "If you are not sure of your lumbar puncture, shoot nothing in." No time is wasted waiting for anesthesia because generally there is no difficulty in doing a lumbar puncture and once the puncture is accomplished, the administration of the anesthetic requires only 1 or 2 minutes and anesthesia is almost immediate. As the operation progresses to completion, the junior surgeon is signalled to prepare for and give the anesthetic to the next patient. As the surgeon finishes his work, the patient is shifted (or not, as the case may be) to the sew-up room, where one of the operating assistants closes the wound. In short, spinal anesthesia is applicable where anesthesia is desired in a rapid succession of cases.

There is little doubt that the best results with spinal anesthesia are obtained if one man gives it constantly and a sufficient number of times to meet a great variety of conditions so that he has a chance to see and evaluate the good and the ill effects.

In the earlier day of spinal anesthesia it was considered that a patient, in order to be a fit subject for this type of anesthetic, must be robust and strong, should not have too low a blood pressure and certainly should have no cardiac disorder. In other words, he had to be a splendid physical specimen, *the ideal surgical risk for any type of anesthesia.* This attitude has undergone a marked change and in clinics where spinal anesthesia is largely used, one sees it being given in cases that otherwise would be extremely poor surgical and anesthetic risks.

Spinal anesthesia, in our opinion, is *applicable* to most surgical procedures below the diaphragm but is not indicated in all such procedures. Its applicability should not vary, but the indications in different clinics may vary, depending on individual methods in general and the time consumed in operations in particular. The indications usually include the desire to save the patient from an inhalation anesthesia and to have muscular relaxation.

We have limited our use of this anesthetic to surgical work below the diaphragm, but in cases of upper abdominal operations we have frequently had anesthesia as high anteriorly as the second costal cartilage.

The largest number of cases will fall into the group demanding abdominal relaxation for proper exposure and work. This group will include acute appendicitis with pus in the peritoneal cavity. Absolute relaxation of the abdominal musculature and quietness of the viscera are two factors of untold worth to the surgeon in protecting the general peritoneal cavity against infection.

Gall bladder surgery is nearly always done under spinal anesthesia. We always keep these patients, especially the obese female, in the horizontal position unless their condition indicates the Trendelenburg posture. A round sand-bag is sometimes placed directly across the table beneath the lower thoracic spine. This causes the liver to be carried forward and downward and makes the operative field more accessible. The ease with which the gall bladder can be exposed and removed under adequate spinal anesthesia is most satisfactory. Surgery of the common bile duct is often made more feasible by the use of this anesthetic. In fact some of these cases have furnished us with examples of the most lasting anesthesia of our series. We have had several in which the anesthesia lasted 3

*Deaver—Surgeon-in-Chief, Lankenau Hospital, Philadelphia, Pa. Eckels—Assistant Resident Surgeon in Urology, Peter Bent Brigham Hospital, Boston. For records and addresses of authors see "This Week's Issue", page 795.

hours and more, while the average duration is from 60-90 minutes.

In the surgical treatment of peptic ulcer, in all of its various manifestations and locations, spinal anesthesia is almost invariably used. There is probably no other single disorder that presents such difficulty in obtaining a "good take" as this one. In case the first administration has produced anesthesia of the abdominal wall but not of the splanchnic region, it is not uncommon to turn the patient on his side and give another injection. Nausea and retching, one of the not uncommon undesirable effects (discussed later) of this anesthesia, are frequently brought on by traction on the stomach in getting proper exposure. This should not be considered too seriously since the retching is usually corrected when the patient, responding to the insistent demands of the anesthetist, breathes more deeply of oxygen administered by a nasal tube. (Fig. 1.)

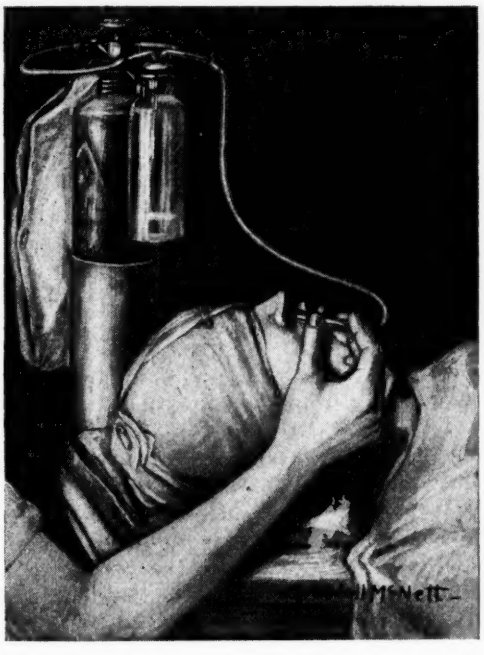

FIG. 1. Holder for the oxygen tank for continuous administration of oxygen.

All pelvic operations, such as fibroid uteri, chronic pelvic inflammations, tumors of the ovary, ruptured extra-uterine pregnancies, intraligamentary cysts, pyosalpinx, are particularly adapted to the use of spinal anesthesia since the patient is kept in marked Trendelenburg position from choice.

Herniae of all classes and descriptions are usually more easily handled under spinal than under general anesthesia. Particularly do we advocate its use in those cases representing poor surgical risks. Strangulated herniae and large incarcerated ventral herniae in fat subjects are repaired with less serious shock to the patient and with much greater facility to the operator.

There is a group of elderly patients who, we believe, stand operation infinitely better under spinal than under inhalation anesthesia. This includes the patient with a hypertrophied prostate, diabetic gangrene, hernia, pelvic, perineal, rectal disorders, etc. In many of these cases we do not feel justified in giving ether anesthesia because of the dangers of postoperative pulmonary complications. In addition many of these patients have high blood pressure and are therefore not ideal subjects for nitrous oxide and oxygen anesthesia. It is unfortunate that we do not know more about the effect of this anesthetic upon the respiratory and heat centers. We do, to some extent at least, know the effect on the circulatory system.

Patients with severe fractures of the lower extremities constitute another group which, when given spinal anesthesia, affords the surgeon an excellent opportunity for reconstructive work. The muscles are so relaxed that in an overriding fracture of the femur the lower fragment may be pulled down and approximated to the upper fragment with ease. If open reduction is required, the muscles are more easily held apart and the bone fragments can be approximated with greater care than with any other type of anesthesia.

The following is a list of surgical cases representing 446 consecutive administrations of spinal anesthesia:

DIAGNOSES

Abortion	2
Abscess, abdominal	3
" appendiceal	1
" prostatic	1
Adhesions, abdominal	4
Appendicitis, acute	69
" chronic	41
Banti's disease	1
Calculus, biliary	20
" renal	1
" ureteral	4
" vesical	1
Carcinoma, bladder	2
" cervix	1
" colon	1
" gall bladder	1
" ovary	3
" prostate	2
" retroperitoneal	1
" sigmoid	1
" stomach	7
" uterus	3
Cellulitis, pelvic	1
Cholecystitis	31
Cirrhosis, liver	2
Cyst, Bartholin	1
" ovary	11
" intraligamentary	1
Cystocele	1
Endometritis	4
Fibroma, abdominal wall	1
Fistula, fecal	4
" gastrojejunal	1
Gangrene, leg	1
" toes	1
Hematosalpinx	1
Hemorrhoids	1
Hernia, epigastric	2
" femoral	1
" inguinal	51

Hernia, umbilical	3
" ventral	12
Hydrocele	1
Hydronephrosis	1
Hydrosalpinx	2
Lacerated cervix	9
Hypertrophied prostate	14
Myoma uteri	50
Nephrolithiasis	1
Obesity	1
Obstruction, intestinal	4
Osteomyelitis, femur	1
" tibia	1
Pregnancy, extrauterine	4
Prolapse uterus	1
Purpura hemorrhagica	1
Pyelonephritis	1
Pyelonephrosis	1
Pylorospasm	2
Pyonephritis	3
Pyosalpinx	1
Salpingo-oöphoritis	7
Salpingitis	5
Sinus, abdominal	1
Stenosis, common duct	2
T. B. kidney	1
T. B. hip joint	1
Thrombo-angiitis, obliterans	1
Ulcer, duodenal	13
" marginal	2
" gastric	6
Undescended testicle	3
Wound, gunshot of abdomen	1

The mental make-up of a patient should be an important factor in deciding what type of anesthesia he or she is to have. The usually calm, collected, rational patient, not readily given to uncontrollable nervousness or to hysterical excitement is the ideal for spinal anesthesia, while the excitable, nervous, emotionally unstable and hysterical patient is not a fit subject for it. Occasionally a patient with mental qualifications unsuitable for spinal anesthesia has a surgical condition (such as perforated appendix with a localized peritonitis) which, in his best interest, demands spinal anesthesia for adequate exposure and safe surgery. In such a case every effort is made to gain the patient's confidence through reason and persuasion. If this does not suffice, the patient may be given nitrous oxide and oxygen until she (less often he) is oblivious to her surroundings and then she is turned on her side and the spinal anesthesia administered. The nitrous oxide and oxygen may be continued or not as desired. In this manner the most satisfactory relaxation of the abdominal musculature is obtained, thus allowing a proper exposure and making it possible to protect the general peritoneal cavity by carefully placed rubber sheets and gauze pads. All the internal parts are quiet and cadaveric rather than being forced through the wound by increased respiratory excursions and muscular spasms.

Some authors maintain that certain physical and mental types of patients are less susceptible to this type of anesthesia than others. With this theory in mind, we have been interested in reviewing our "non-takes", but are unable to verify it. However, we do believe that there may be an individual variation in the chemical composition of the spinal fluid in the occasional case which will inhibit or counteract the anesthetic action of the drug. We are unable to group these patients in any particular physical or mental class.

Our experience is not unlike that of many clinics which have used spinal anesthesia consistently. What we previously considered contraindications[1], now, after experience with 2,302 more cases, we no longer place in that class. Probably the only condition from which we would withhold this anesthesia is in a traumatic emergency with the patient in shock (with a systolic blood pressure below 75 mm. Hg.). In such a condition, if operation were essential, we would prefer nitrous oxide and oxygen. Nevertheless we have done many emergency operations, such as perforated peptic ulcer, ruptured ectopic pregnancy and bullet wounds of the abdomen, under spinal anesthesia with good results so far as the anesthesia and recovery from it are concerned.

Various drugs have been used in this clinic to induce anesthesia by the subarachnoid route. They include novocain, stovocain, scurocain, apothesin, neocain, and spinocain. Of these apothesin and spinocain are the only two which we have used extensively.

As already indicated, the results of subarachnoid block in 2,251 cases with apothesin have been issued from this clinic[1]. Apothesin was also used in the first 656 cases of this series up to June 1, 1928. Chemically, apothesin is the hydrochlorid of diethyl-amino-propyl-cinnamate. It is furnished in crystalline form, which is dissolved in a small amount of spinal fluid and re-injected into the subarachnoid space. For details of technique see Schutz's article on "Spinal Anesthesia[1]."

It should be observed here that, as a *fundamental principle of general chemistry,* whenever a crystalline substance, such as apothesin, novocain, neocain and the like, is dissolved in a medium such as the spinal fluid, the resultant solution must necessarily be of a greater specific gravity than the remaining fluid within the spinal canal. With this in mind the anesthetist should place the patient in the position which he prefers for making a lumbar puncture. We formerly believed the ideal posture for this was the sitting position with the head and shoulders dropped well forward. Once the anesthetic is administered, no time should be lost in placing the patient with the head lower than the hips so that the medulla may constantly be well supplied with blood. For reasons to be discussed later we have abandoned this posture for the horizontal position.

Spinocain (Pitkin's solution) is a solution of novocain crystals (100 mgms. per 1.0 cc.) in a special solvent consisting of 14.5% alcohol in sterile distilled water with the addition of a derivative of wheat protein amylo-prolamin. The alcohol is added to the solution of novocain

crystals in order to reduce its specific gravity below that of the spinal fluid. The resulting solution, being lighter than the spinal fluid, if injected into a column of spinal fluid, will tend to diffuse upward more rapidly than in other directions. Pitkin and others who advocate the use of this anesthetic agent warn against giving it to a patient in the sitting posture for fear of inhibiting the medullary centers,—particularly the respiratory center. He further states that spinocain administered at the level of the fourth lumbar interspace with the patient in the sitting posture will travel upward to the level of the lower cervical region in 9 to 11 seconds. When we first began using spinocain, our routine consisted of administering the same dosage (2 cc.) to each patient in the sitting posture. The patients were kept in the sitting posture from 10 to 50 seconds during the administration without any untoward effect. Once the drug was administered, no time was lost in placing the patient on his back and placing the table in 5 degrees Trendelenburg position. This technique was followed from June 1, 1928 to October 20, 1929 and included a group of 1,189 cases. In this group there was one death on the operating table in a patient who was practically moribund at the start.* Upper abdominal as well as lower abdominal operations were done with this method, although "good takes" for upper abdominal work were less certain than with our present technique.

*See case report below.

TECHNIQUE FOR ADMINISTRATION OF SPINAL ANESTHESIA

Duties of the Anesthetist:

1. The blood pressure is taken as soon as the patient arrives in the operating room and again at the completion of the operation.
2. The patient is placed on his right side with thighs acutely flexed, shoulders and head carried forward. (Fig. 2.) The operating table may be either in a 5 degree Trendelenburg angle or level. A thin pillow may be placed under the head while the patient is on his side, but the head should never be elevated beyond the erect position. An assistant holds the patient firmly in a forcibly flexed position with one arm passed just back of both knees and the other on the back of the neck.
3. As soon as the anesthesia has been administered and the patient is placed on his back, a continuous flow of oxygen is administered through a soft rubber tube inserted just inside one nostril. This we believe has two important effects: the psychic effect is beneficial because many patients think they should be breathing in some sort of "gas" and it actually prevents some nausea.

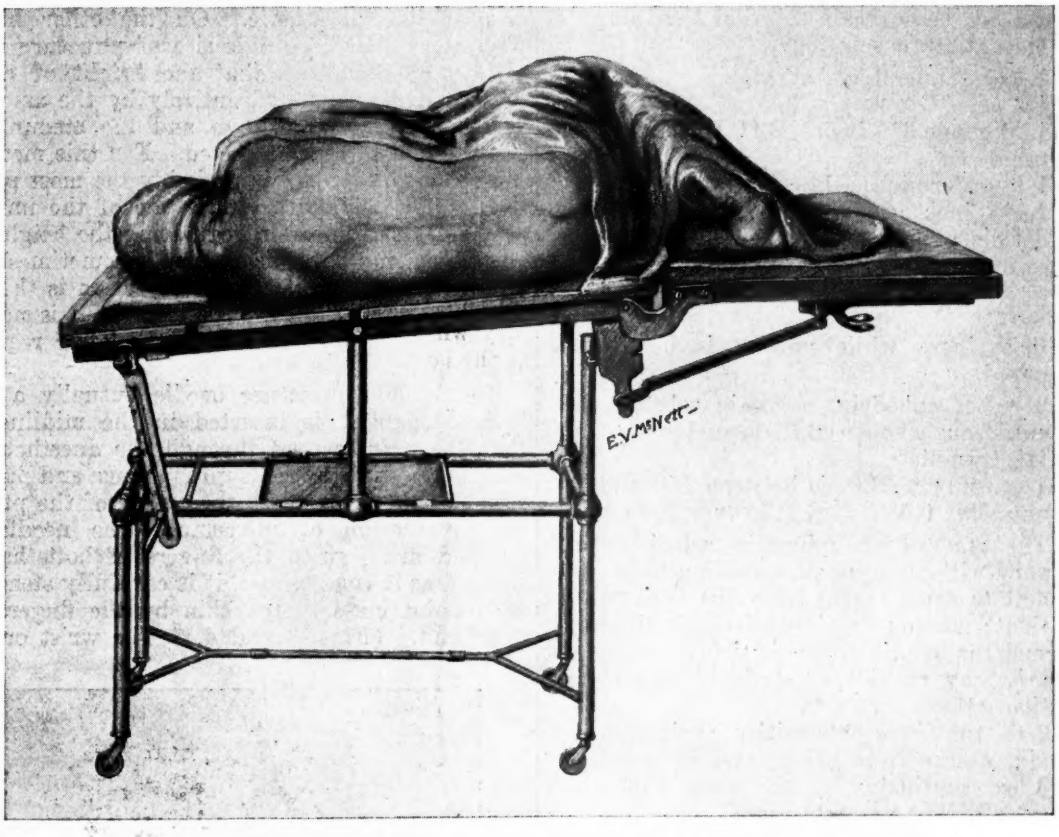

FIG. 2. Improvised tiltometer scale on side of operating table used in spinal anesthesia.

Duties of the Nurse:

1. Scrub the patient's back with acetolphen (Whiting's) solution. Formula: acetone 35, alcohol (95%) 64, phenoco 1.
2. Drape sterile cloths over hips and shoulders.
3. Apply iodine (3%) to an area 4x8 inches at the level indicated by doctor.

Information for the doctor:

Materials

1. Solution of spinocain (Pitkin's light solution) 2 cc. ampules (in antiseptic solution).
2. Ephedrine-novocain solution 1 cc. ampules (in antiseptic solution).
3. 1-4 cc. "Luer Lok" syringe.
   1-2 cc. " " "
   1-20 gauge 3½ inch "B.D. Erusto" spinal needle.
   1 hypodermic needle—25 gauge.
   1-1½ inch needle with guard for intradermal and hypodermal injection of novocain and ephedrine.

Dosage

(Fill syringes while patient is being prepared.)

A. 2 cc. of ephedrine-novocain solution subcutaneously when B.P. is under 150 mm. Hg. systolic.
   1 cc. only if B.P. is between 150 and 200 mm. Hg., 0.5 cc. if B.P. is over 200 mm.

B. The amount of spinocain solution must vary with the type of operation to be done and to some extent with the type of patient; nervous and sensitive individuals, such as peptic ulcer patients frequently are, may require a relatively larger dose than others.
   2 cc. for lower extremities, perineum, cervix, uterus from below, and prostate.
   3 cc. routinely for all lower abdominal cases except prostate cases.
   4 cc. for gall bladder, stomach, duodenum, spleen, pancreas, and kidney operations.

Administration:

The novocain-ephedrine solution performs the double function of a local anesthetic and a circulatory stimulant. The solution is taken up in the 2 cc. syringe and with the fine hypodermic needle attached, an intradermal injection is made so as to produce a wheal ½ inch in diameter. The hypodermic needle is then detached and the 1½ inch needle attached. This needle is thrust through the anesthetized skin, the subcutaneous tissues, the supraspinous and the interspinous ligaments in exactly the same path as the spinal needle will be inserted. The novocain and ephedrine solution is discharged into all of these tissues in advance of the needle and if done properly the patient will feel absolutely no pain from the introduction of the spinal puncture needle. Even the dura will be insensitive.

The level of the lumbar puncture will govern, to some extent, the level of anesthesia. For work on the perineum or on the lower extremities, use the space most readily entered below the second lumbar spine. For lower abdominal work such as pelvic operations and appendicectomies, the second lumbar interspace, and for upper abdominal work the first lumbar interspace may be used. Higher anesthesia may also be obtained by removing larger amounts of spinal fluid before injecting the estimated dose of the anesthetic. On the other hand, we believe that a specific site of puncture may always be used and that the height of anesthesia can be regulated entirely by the amount of spinal fluid withdrawn and the amount of anesthetic solution reinjected. For this method the second interspace is probably the most practical. This method excludes one of the important variable factors in regulating the height of anesthesia and for this reason is sometimes advocated (4). One pertinent objection is that it produces much higher anesthesia than is necessary when the operation is in the lower regions of the body.

The lumbar puncture needle (usually a 3½ inch 20 gauge) is inserted in the midline so that the point passes through the anesthetized skin and through the supraspinous and interspinous ligaments along the course of the previous instillation of novocain. The needle is grasped firmly with the fingers of both hands so that, as it is advanced, it is carefully steadied at a point close to the skin by the fingers of one hand. (Figs. 3 and 4.) The wrist or remaining fingers of this hand should be placed firmly against the patient's back so that any unexpected movement of the patient will not alter the position of the needle in the back. (Fig. 5

FIG. 3. Correct method of holding a spinal puncture needle. Horizontal posture.

shows an incorrect method of inserting a spinal needle.)

The spinal fluid is at first withdrawn, using the same syringe as was used in administering the novocain-ephedrine solution. Allow the spinal fluid to flow out by gently rotating and retracting the piston of the syringe. Never

FIG. 4. Correct method No. 2 of holding a spinal puncture needle. Sitting posture.

FIG. 5. The incorrect method of holding a spinal puncture needle.

forcibly retract the piston. Remove 1 cc. less fluid than the dose of spinocain which is to follow. For example, if the dose of spinocain is to be 4 cc., gently withdraw 3 cc. of spinal fluid and replace the tip of the stylet until syringe No. 2 containing the desired amount of spinocain solution is ready to be attached.

The syringe containing the spinocain is then attached firmly to the needle by its lock, care being taken not to have a bubble of air in the syringe. Spinal fluid is withdrawn: first in order to establish a free flow; secondly, to prevent any possibility of injecting a bubble of air; and thirdly, in order to obtain a better diffusion when the spinocain is injected. Three mixtures of spinocain and spinal fluid are usually made, injecting slightly more than half of the total amount of each mixture each time until the third time, when all is injected. Do not at any time forcibly withdraw the plunger. If the spinal fluid does not flow freely, rotate the needle on its axis; or insert or withdraw the needle about ¼ inch. If free communication is not certain, another puncture should be made. The dictum of this clinic should always be heeded: *"Never inject until you are sure of the location of the point of the needle."* If an air bubble enters the syringe, tip the handle of the syringe upward. This allows the injection of all the anesthetic but leaves the bubble in the syringe.

When the injection is completed, withdraw the needle with a firm and steady motion in the line of its axis, making counter pressure on the skin adjacent to the needle shaft with the ball of the thumb. As the needle comes out of the skin, make lateral pressure with the ball of the thumb so that the skin slides and the thumb makes pressure over the site of the needle puncture in the deeper tissues. Apply a bit of cotton with a drop of collodion to the needle puncture of the skin.

As soon as the injection is completed, the patient is turned flat on his back and should not be allowed to lift his head. The height of anesthesia will be determined by what has taken place previously. The table should be placed in a 5-10 degree Trendelenburg position. It is our experience that for operations on the gall bladder and on the stomach the table can be made horizontal and left in that position throughout the operation. Indeed, a sand bag or a kidney bench may be used beneath the lower thoracic spine without ill effect. If a patient at any time shows some untoward signs, such as vomiting or circulatory depression, or a sudden drop in blood pressure, the anesthetist must notify the surgeon and place the patient in a moderate Trendelenburg position.

In case a patient becomes pulseless and has a dull expression about the eyes, or in case a critical condition is detected by a sudden and marked fall in blood pressure, the following measures are to be carried out:

1. The anesthetist must notify the surgeon and lower the patient's head 16 to 18 inches.
2. A hypodermic syringe containing 1 cc. adrenalin hydrochlorid 1:1000 must always be on hand ready for administration at a moment's notice. The usual dose given intramuscularly is 0.5 cc.

3. The equipment and solution necessary for a normal saline infusion should always be ready for immediate use. All infusions are given by the junior surgical intern. The vein should always be cut down upon and a cannula inserted. No time should be wasted in attempting to "stick a vein" because under the most favorable working conditions this is an uncertain procedure in severely shocked patients. The time required from the instant the order is given by the surgeon for the administration of a saline infusion until the cannula is tied in the vein and the saline is running should not exceed three minutes.

The frequent moderate depressions of blood pressure do not give much concern. It has been the custom in this clinic to take the blood pressure only before and after the operation. It is not followed during the operation. The surgeon, with his hand inside of the abdomen, has an ample additional check concerning the condition of the patient over and above the pulse, respirations and the appearance of the patient to the anesthetist.

A satisfactory anesthesia is not obtained in all cases in which this type of anesthetic is administered. The failures vary from a "no take", when the patient's sensation of pain is apparently unaltered and he is able to lift his feet off of the operating table, to a "fair take" when there is absence of pain but the abdominal muscles are not entirely relaxed. A very common experience is to be able to cut through the abdominal wall without difficulty until traction is made upon the parietal peritoneum, which then causes pain. In other cases there appears to be *perfect and complete anesthesia* with relaxation which lasts only for a few (15-20) minutes; then the muscles become rigid and a little later painful sensations appear. We have seen patients with this reaction turned on their side again in the midst of an operation and given a second intraspinal injection, the effects following the second injection having three possible results: first, no anesthesia; second, good anesthesia for a very short period which again soon wears off; and third, good anesthesia for an adequate period of time.

Our observations suggest three primary causes for the unsatisfactory results in spinal anesthesia. *First:* poor technique in doing the lumbar puncture and in the administration of the anesthetic probably accounts for a goodly number of the "no takes". The sitting posture with the head and shoulders drooped forward and downward is certainly the ideal posture for a lumbar tap. In this position any one with a little experience should be able to perform a clean-cut puncture. Although this position was used in the majority of the cases of this series, we abandoned it for the horizontal position when we began to use larger doses of the anesthetic solution. Nothing but a sharp needle with a short bevel and a good fitting obturator should be tolerated.

It may be argued by some that because a new man gives the anesthetic every three months he cannot become very adept at the procedure. This would be a valid argument if he had to do it only occasionally, but in the Lankenau Clinic the intern averages 250-300 such anesthesias during the time he is in charge of the work. We feel that after one has done 50 lumbar punctures he has learned the technique well enough to be able to judge as to the location of the point of the needle. The importance of a free flow of spinal fluid is emphasized during the withdrawal and the mixing with the anesthetic solution. If a bloody spinal fluid flows from the needle and it does not become clear after 2 or 3 drops, a new puncture is made in another interspace.

In spite of these precautions there are occasional failures, which are undoubtedly due to placing the anesthetic in the improper place. The explanation of the severe fall in blood pressure given by Koster and Kasman[4], to the effect that the point of the needle may be advanced too far and may therefore lie anterior to the denticulate ligaments which divide the subarachnoid space into an anterior and a posterior chamber, is not borne out by anatomical facts. The denticulate ligaments are filmy thread-like structures found only in the cervical and thoracic regions, bridging the space between the arachnoid and pia mater on either side of the spinal cord. Their chief function is to steady the spinal cord, surrounded as it is with cerebrospinal fluid, and at best they are incomplete septa. They cannot possibly prevent the lateral diffusion of the anesthetic agent in the lumbar and lower thoracic regions.

Secondly: There may be a very decided difference in the chemical constituency of the spinal fluid of various patients. There seems to be some neutralizing substance (possibly an oxidizing agent) which is present in some individuals in such quantities as to entirely neutralize the effect of the novocain as soon as it is administered. In such cases no anesthesia is obtained. If this unknown substance is present to a less extent, it is conceivable that there may be good anesthesia for 10-20 minutes, followed by rapid recovery of muscular action and sensation. If a second dose is administered, it may or may not be effective, depending upon the amount of this X-substance which is not already bound up with the previously administered drug.

Thirdly: The drug used may not be of uniform strength despite the repeated assurances of the manufacturers that their method of production and preparation offers no possible chance for this error. It should be remembered, however, that novocain is extremely thermolabile and that its anesthetic action is greatly dimin-

ished by the slightest overheating. This difficulty was encountered in this clinic a number of years ago when our own pharmacist undertook to sterilize novocain crystals in bottles by dry heat. It was again encountered in the use of apothesin when, after dissolving the crystals in spinal fluid, it was immediately taken up into a hot syringe just removed from the sterilizer. On two or three occasions we have encountered a supply of spinocain which has given as high as 80% unsatisfactory anesthesia and upon discarding the remainder of that supply and obtaining a new batch, we got our normal "good takes" again. We realize, of course, that this is not absolute proof of impotency of the product, but on several occasions we have had very suggestive evidence to this effect. All ampules should certainly be carefully inspected for any imperfection in sealing before the tip is broken off.

We have experienced no disadvantage in administering a general anesthetic in case a poor anesthesia results from intraspinal administration.

Nitrous oxide and oxygen is the most common additional anesthetic used. Ether is used if relaxation as well as insensibility is required. A frequent sequence is nitrous oxide and oxygen followed by ether. If the patient is wild and uncoöperative, he is very apt to receive a few drops of chloroform administered by "the Professor" himself.

The necessity for the administration of a secondary anesthetic may be grouped under 4 headings, with approximate percentages indicated:

a) Good anesthesia—with patients who are extremely nervous and do not want to be awake; or those whom the surgeon may wish to be insensible to the conversation regarding operative findings ..... 21 per cent.

b) Good anesthesia which does not last long enough ..... 22 per cent.

c) Fair anesthesia—muscles relaxed—pain on handling parietal peritoneum ..... 15 per cent.

d) No anesthesia—"poor take"..... 42 per cent.

Local infiltration with novocain is never used. By constantly improving our technique we have been able gradually to reduce the number of cases which require additional anesthesia.

This review* includes all of the cases in which spinal anesthesia was given over a period of 36 months (March 22, 1927 to March 22, 1930)—a total of 2,302 cases. Table I indicates the frequency with which an additional inhalant anesthetic was used in the series as a whole and the relative frequency with each of two anesthetic drugs used.

TABLE I

Total number operative cases	5,373
Total number spinal anesthesia	2,302
Percentage total cases given spinal anesthesia	42.8 per cent.
Total number—additional anesthesia	745
Percentage of cases requiring additional anesthesia	32.3 per cent.
Total number—apothesin anesthesia (March 22, 1927 to June 2, 1928)	656 cases
Apothesin plus additional anesthesia —all causes	344 cases
Percentage cases given additional anesthesia	54.4 per cent.
Total number—spinocain anesthesia (June 2, 1928 to March 22, 1930)	1,646 cases
Spinocain plus additional anesthesia —all causes	405 cases
Percentage cases given additional anesthesia	25.2 per cent.

*A previous review of 2,251 cases by Schutz for the previous three-year period—March 22, 1924 to March 22, 1927—has been referred to[1]. This makes a total of 4,553 cases reported from this clinic during the 6 years from March 22, 1924 to March 22, 1930.

TABLE II

Month	No. Operations	No. Spinal Anesth.		Good Take		Add. Anesth.	Fair Take		Add. Anesth.	Poor Take		Add. Anesth.
July, 1929	105	40	38	35	87.5	1	0	0	0	5	12.5	5
August	76	18	23.7	9	50	0	1	5.5	1	8	44.5	7+(?)
September	153	81	53	67	83	10	2	2.5	2	12	14.8	12
October	139	68	49.4	53	78	9	5	7.3	3	10	14.7	10
November	160	86	53.8	75	87.4	12	2	2.3	2	9	10.3	9
December	126	74	59	66	90	10	5	6.7	5	3	4.2	3
January, 1930	162	82	50.7	70	85.5	5	3	3.6	3	9	10.1	9
February	152	102	67	89	87.3	6	4	3.9	4	9	8.8	9
March (1-22)	123	92	75	88	96	12	3	3.2	2	1	1.1	1
Total	1196	643	54	552	85	65	25	3.9	22	66	11	65

Total number additional anesthesia 152 cases

Percentage total spinal anesthesia requiring additional anesthesia 23.75 per cent.

Additional anesthesia used as follows:

Nitrous oxide and oxygen	98
Nitrous oxide and oxygen—Ether	45
Nitrous oxide and oxygen—Ether—Chloroform	3
Ether—Chloroform	2
Nitrous oxide and oxygen—Chloroform	1
Ether	1
Chloroform	1
Spinal Anesthesia (Repeated)	1
Total	152

In October 1929 we materially changed our method of administering spinal anesthesia to the present technique which is herein described, and with good results. Table II is a composite picture of results during the past 9 months, indicating an increase in the use of spinal anesthesia together with relatively superior results, as may be seen by comparison with Table I.

It will be noted that 54 per cent. of all operated patients during the past 9 months received spinal anesthesia. This is an increase of 12 per cent. over the percentage receiving spinal anesthesia in the whole series and represents fairly accurately the percentage for the past 18 months. The number of "good takes" has increased to 85 per cent. of the total.

It is also worthy of note that as many cases in the "good take" category received additional anesthesia as in the "poor take" group. This is explained by the fact that approximately one-half of the former were very nervous patients who were given an analgesic dose of the nitrous oxide and oxygen and the other half consisted of cases in which the anesthesia did not last sufficiently long to allow for completion of the operation.

The most common immediate disorders are fall in blood pressure, nausea and vomiting, and difficulty in respiration.

The vascular system of each patient should be carefully studied preoperatively from the view points of (a) cardiac function and capacity; (b) the average blood pressure and the blood pressure just prior to administration of the anesthetic; and (c) the presence or absence of peripheral sclerosis.

The blood pressure is taken as the patient is being prepared for the administration of the anesthetic. The systolic pressure at this time will largely govern the amount of ephedrine sulphate to be administered subcutaneously (see under *Technique of Administration*). Our present view is that a patient who does not have much vascular sclerosis should be given an adequate dose of ephedrine immediately (within 1-2 minutes), before the anesthetic is administered. In the presence of poor cardiac function, low cardiac reserve, or considerable peripheral sclerosis we reduce the initial dosage of ephedrine somewhat but always stand ready to give small repeated doses (0.2 to 0.5 cc.) of adrenalin hydrochlorid 1:1000 subcutaneously or intramuscularly. We are inclined to use adrenalin secondarily as a cardiac stimulant instead of repeating the ephedrine.

A slight reduction of both the systolic and diastolic blood pressures soon after the anesthetic has been given is the rule rather than the exception. Frequently this reduction is concomitant with the opening of the peritoneal cavity or the beginning of the operation. A fall of 10 to 25 per cent. in the systolic pressure is usu-

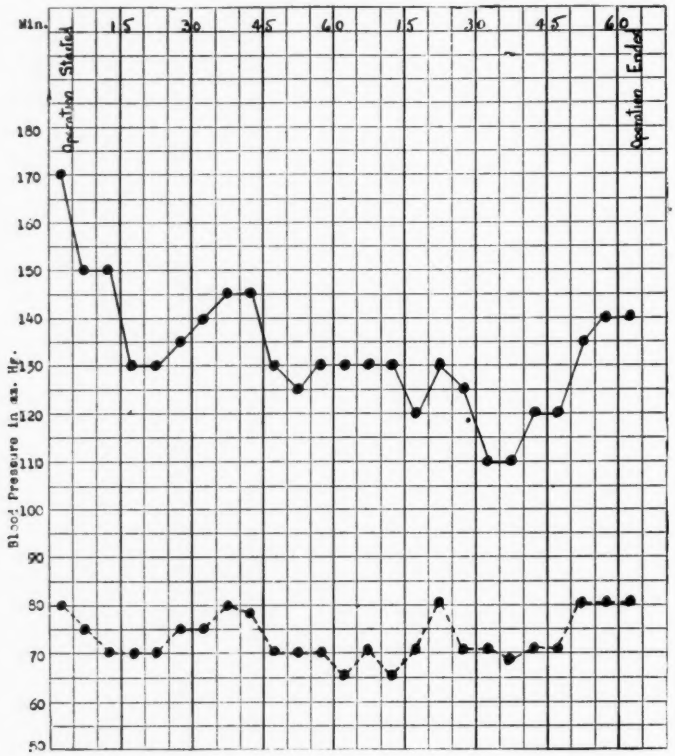

CHART 1. Shows the usual early fall in the systolic blood pressure with the maintenance of a fairly constant level thereafter. (Spinocain 3cc. in the 2nd lumbar interspace with patient on side and Trendelenburg 5°.)

ally of no consequence, particularly if the patient is in the Trendelenburg posture. Chart 1 shows the usual initial reduction in systolic blood pressure with a rather constant maintenance once the lower level is reached.

Chart 2 is a graphic representation of the preoperative systolic blood pressure in 465 consecutive cases. Eighty per cent. of all these cases fall into the groups between 90 and 140 mm. Hg.

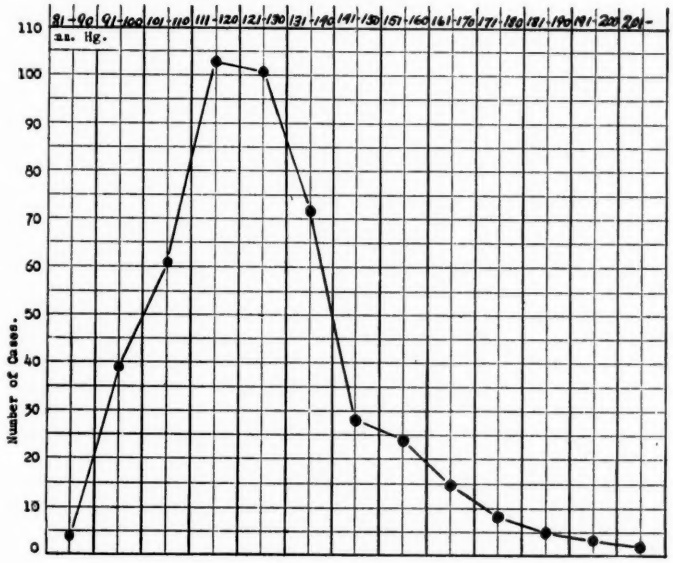

CHART 2. Shows the distribution of a total of 465 cases into various blood pressure groups as determined by the systolic pressure before operation.

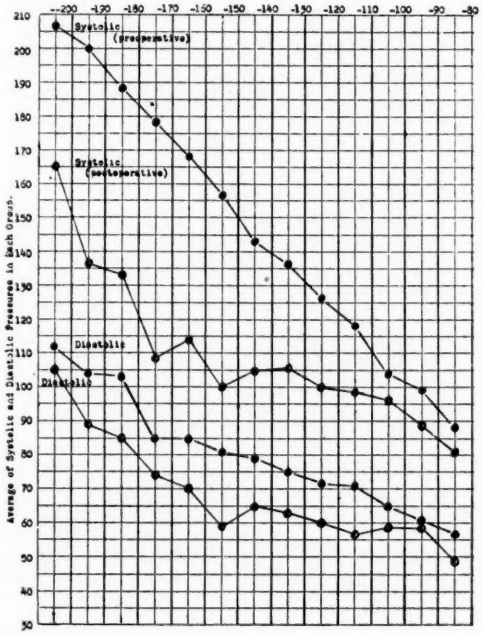

CHART 3. There is a greater relative fall in the systolic blood pressure in the high blood pressure groups as compared with the low pressure groups.

We have observed that many cases with a high preoperative systolic blood pressure have a relatively greater fall in pressure during the operation. With this in mind we have analyzed the same 465 cases represented in Chart 2. In each case the preoperative and a postoperative blood pressure was taken. The same grouping obtains as in Chart 2—determined by the preoperative systolic pressure. Chart 3 shows the results. There is a greater percentage of fall in the postoperative systolic pressures in the higher groups, whereas the postoperative diastolic curve fairly closely parallels the preoperative curve.

Retching is a moderately frequent occurrence, especially when high anesthesia is obtained. It is distressing to the patient and its onset has been frequently observed to coincide with a rather sudden fall in blood pressure. (See Chart 4.) There is a suggestion that this type of vomiting is central in action and is due to a disturbance of the relative mechanics of the spinal fluid and blood rather than to any direct action of the drug upon the vomiting center. The nausea usually ceases as the pressure begins to rise. Oxygen is administered through a nasal tube constantly and is believed to reduce the nausea. Aromatic spirits of ammonia, if administered carefully on a small piece of gauze may be of some value. The most efficacious agent is adrenalin given in small doses (0.2 to 0.5 cc.) subcutaneously. (See typical effect in Chart 4.)

The complaint of difficulty in breathing on the part of the patient occasionally occurs, particularly in nervous individuals. If high anesthesia is obtained, the lower intercostal muscles are functionless. This should be of no particular concern. Oxygen, again, is of value here in that the patient's attention can be diverted to breathing deeply. In upper abdominal work anesthesia is frequently obtained to the level of the second costal cartilage and without ill effects.

The remote complications in our experience

are postural headaches and very occasionally prolonged nausea and vomiting.

Postoperative headache occurs in approximately 5 per cent. of the cases and in these it is only occasionally really severe. It usually occurs 4-6 days after operation as the patient is allowed to sit up or is placed in the Fowler position. Occasionally headache occurs as late as the twelfth day in patients who have been kept flat in bed for this period. The headache usually begins in the frontal region, is severe in the postorbital region and from thence is referred to the vertex and the occiput. The treatment is to place the patient flat in bed without a pillow and to elevate the foot of the bed. If this does not give relief, a retention enema of 500 cc. of 50 per cent. magnesium sulphate is given. An ice-bag to the head and small doses of aspirin and pyramidon may be helpful.

Nausea and vomiting are very occasionally associated with the severe headaches, but these dysfunctions are rarely so marked as to cause much concern.

We have seen almost no persistent paresthesia and anesthesia that could definitely be attributed to spinal anesthesia. If a patient has such a nerve lesion, which, upon superficial observation, one might be inclined to feel was due to the spinal anesthesia, a careful study of that patient should be made from a neurological standpoint. In one patient with a slight persistent paresthesia of one foot we found a spina bifida occulta. In another patient who gradually lost the motor power of the lower extremities following an appendectomy, a retroperitoneal sarcoma was discovered.

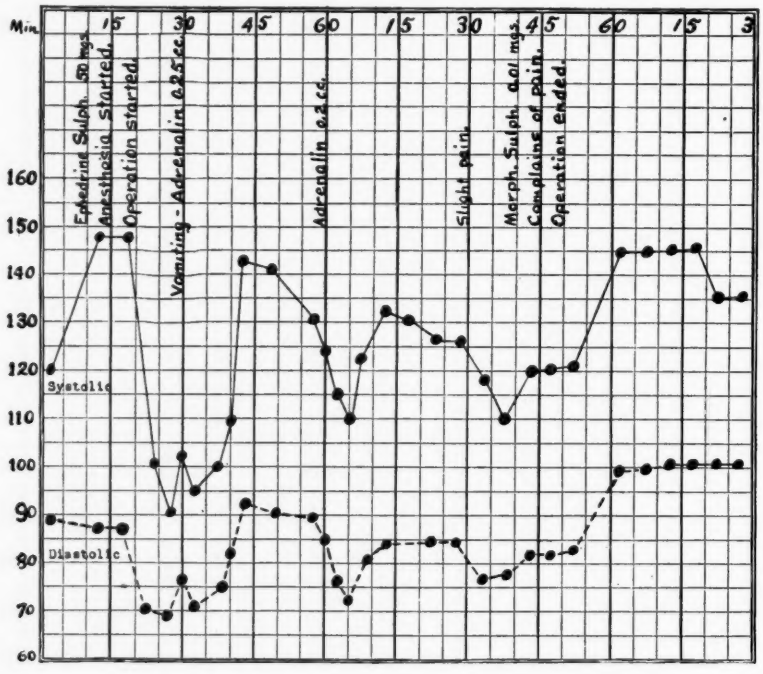

CHART 4. Shows the variation in the systolic and diastolic blood pressure during an abdominal operation. Preliminary medication: Morph. sulph. 0.015 gms. and Scopolamine 0.0003 gms. one-half hour before operation. Anesthetic: Spinocain 3 cc. in third lumbar interspace.

REPORT OF TWO FATAL CASES

In this series (2,302 cases) there were two fatalities; the first, we believe, due directly to the anesthesia; the second, primarily to the operative shock in a patient almost moribund.

CASE 1. No. 3049-27. M. B., colored female, married, 38 years of age, admitted to the surgical service October 24, 1927, with a severe attack of pain in the right lower quadrant, radiating across the lower abdomen, of one year's duration. Attacks occurred once a week; occasionally very severe and colicky in nature; abdomen felt tight and bloated. Seen by her physician four months and one month before admission, and told she had an abdominal tumor. Abdomen was becoming larger during the month prior to admission. General health good. Chronic constipation. No menstruation for six months. Married 22 years. Four children living and well. No miscarriages. Right oöphorectomy and D. and C. 7 years previously.

Physical examination showed a well developed and obese colored woman. Head and chest normal. Blood pressure 156/80. Abdomen large and obese. Midline hypogastric scar of previous operation. A large nodular mass felt in the lower abdomen. No fetal heart sounds heard. Vaginal examination: a thin white discharge; a soft, succulent cervix and a hard mass pressing down on the cervix. This mass could be pushed up out of the pelvis and was not unlike a fetal head.

Provisional diagnosis: Fibroid uterus; pregnancy.

The full dose (0.12 gms.) of apothesin was given without any difficulty. Several minutes later the patient began having difficulty in breathing. The pulse was good but the respirations were labored and in

gasps. Stimulants were immediately given but to no avail. Respirations ceased; and finally the patient became pulseless.

CASE 2. No. 3049-26. A. M. P. The second fatality occurred in a woman 35 years old with thyroid toxicosis. She had had an appendectomy and later a cholecystectomy, which was followed by leakage of bile into the peritoneum, for which incision and drainage had been done. Eighteen months later the abdomen was again opened, when a large amount of bile-stained fluid was evacuated. The liver and spleen were found much enlarged and the head of the pancreas firm and hard. Spinocain was given but did not produce the necessary anesthesia, whereupon nitrous oxide and oxygen were administered. The patient died soon after the abdomen was opened—apparently of surgical shock.

SUMMARY

A report of the results following 2,302 administrations of spinal anesthesia is herewith submitted which, together with a previous report[1], totals 4,553 spinal anesthesias from this clinic.

The advantages and disadvantages of this type of anesthesia are discussed from a clinical viewpoint.

A technique of administration, which has proved practical and efficacious, is given in detail.

A graphic study of the blood pressure before, during, and after anesthesia is incorporated.

Two fatalities are reported.

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THE USE OF THYMOPHYSIN IN LABOR*

BY MAX DAVIS, M.D.†

OF late years there have been many attempts in various ways to lessen the pains of childbirth. Through these efforts, there were evolved the different forms of obstetrical analgesia which were to secure the partial relief or complete obliteration of the labor pains. These methods have had varying degrees of success, accompanied, of course, by certain objectionable features which have hitherto prevented any one of them from reigning supreme in this field. In our own experience, the synergistic method of Gwathmey has been the most favorable.

A different method of relief lay in the direction of the shortening of the total length of labor. When pituitrin was first discovered, it was believed that the drug for this effect was at hand. Unfortunately, however, it was soon found out by sad experience that pituitrin is an extraordinarily powerful drug which has a great tendency to cause tetanic contraction of the uterus, and if given early in labor, may cause rupture of the uterus as a direct result of such tetany, with a consequent disastrous outcome for mother and baby. From such experiences it was learned that if pituitrin is to be used at all antepartum, — and most obstetricians vehemently oppose such usage,—one has to be very cautious with it, to use only small doses, to watch the patient very carefully, and to give it only during the expulsive stage of labor. Hence pituitrin itself has justly come to occupy a very minor rôle during the progress of labor.

Five years ago, Dr. Nicholas Temesvary of Budapest, Hungary, made a preliminary report before the meeting of the German Gynecological Society of a new drug, thymophysin, a combination of pituitary extract and thymus extract, which had the effect of shortening the total length of labor. Since then, various reports have been published of the use of this extract in labor, and practically all have been highly laudatory. A fine review of the literature on this subject is contained in the article by Julius Jarcho[1]. With reference to the pharmacological action of thymophysin, I quote from Jarcho's summary of Temesvary's observations:

"In his 1926 article, he (Temesvary) described at length experiments on isolated uterine segments, in which he found that thymus extract alone in relatively large doses increases uterine contractions slightly and that this action is much augmented by addition of pituitary extract. Also, the action of pituitary extract on the uterine muscle was prolonged by combination with thymus extract and modified so that the contractions became more rhythmical than with pituitary extract alone.

"The action of pituitary extract on uterine muscle appears to be a specific one; that of thymus extract, a non-specific action. Investigations by Müller and del Campo have shown that, when muscular fatigue is induced by electrical stimulation, thymus extract inhibits fatigue and increases muscular contractions under prolonged stimulation, provided that the muscle is not too greatly fatigued before the thymus extract is used. This observation probably best explains its modifying effect on the action of pituitary extract on uterine muscle."

Our own experience in the use of this drug comes from a series of fifty cases which were followed very carefully in order to secure complete details of its effect upon labor. These results are summarized in the following table, and the detailed history of each case, together with the history of previous labors in the multiparae, is to be found appended to the end of this report, the numbers of the cases in the table corresponding with those of the histories.

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Case Number	Parity	Age	Color	Term	Position	At Time of Giving Thymophysin: Hours in Labor	Character of Pains	Condition of Cervix	Position of Head in Pelvis	Amount of Thymophysin Given	After Giving Thymophysin: Character of Pains	Duration of Labor	Type of Delivery	Weight of Baby	Sex	Remarks
1	I	29	W	Full	LOA	18 hrs.	Mod. strong Lasting 25 sec. every 5′	Thin 4-5 fingers dilated	Mid pelvis	2 doses 0.5 cc. each	Very strong, lasting 50-55″, interval of 2′	59′	Normal	8:1	M	Moderately strong pains only for last two hours of the 18.
2	I	26	W	Full	LOA	10 hrs. Light	Weak Lasting 15-20″ every 5′	Mod. thin 2 fingers dilated	High in pelvis	2 doses 0.5 cc. each	Very strong, lasting 40-45″, interval of 1.5′	2 hrs. 20′	Normal	7:8	F	Very light labor before giving thymophysin.
3	I	26	W	Full	LOA	4 hrs. 50′	Mod. strong Lasting 30″ every 4-5′	Thick 1 finger dilated	Head at brim Unengaged	2 doses 0.5 cc. each	Very strong, lasting 50-60″, interval of 1′	2 hrs. 40′	Mid forceps	8:5	M	
4	I	31	W	Full	ROP	2 hrs. 5′	Weak Lasting 10-15″ every 10-15′	Mod. thick 2 fingers dilated	High in pelvis	2 doses 0.5 cc. each	Strong, lasting 40″, interval 1.5′	2 hrs.	Mid forceps	6:9½	M	Labor before giving thymophysin very poor; pains irregular, without force. Pt. died of pulmonary embolus during delivery.
5	I	25	W	Full	ROP	12 hrs. 28 min.	Weak Lasting 15″ every 5-6′	Mod. thin 2 fingers dilated	High in pelvis	1 dose 0.4 cc.	Very strong, lasting 50-60″, interval 2′	2 hrs. 32′	Low forceps	6:00	M	
6	I	24	W	Full	LOA	50′	Weak Every 10-15′	Thick 1 finger dilated	High Mid pelvis	2 doses 0.5 cc. each	Very strong, lasting 50-90″, interval 0.5-1′	2 hrs. 40′	Low forceps	6:13½	M	
7	I	18	W	Full	LOP	50′	Weak Every 10′	Thick No dilatation	At brim Unengaged	4 doses 0.5 cc. each	Strong, lasting 40-60″, interval 1-2′	13 hrs. 20′	High forceps	7:7½	M	Borderline Caesarean; very much moulding of head. (See details of case below.)
8	I	29	W	Full	LOP	4 hrs. 20′	Weak Lasting 15″ every 15′	Thick 1 finger dilated	High in pelvis	2 doses 0.5 cc. each	Strong, lasting 30-50″, interval 2-3′	2 hrs. 20′	Mid forceps	7:12¼	M	
9	I	24	W	Full	LOA	2 hrs. 35′	Weak Every 10′	Thick 2 fingers dilated	High in pelvis	2 doses 0.5 cc. each	Mod. strong, lasting 40-45″, interval 2-3′	1 hr. 30′	Normal	7:1½	M	
10	I	24	W	Full	LOA	12 hrs. 30′	Mod. strong Lasting 30″ every 5′	Thick 2 fingers dilated	Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50″, interval 1′	50′	Normal	6:15	M	Hard pains for 3 hours before giving thymophysin.
11	I	19	W	Full	ROA	3 hrs. 15′	Weak Every 8-10′	Thick 1 finger dilated	High in pelvis	2 doses 0.5 cc. each	Very strong, lasting 60″, interval 1′	2 hrs. 45′	Low forceps	7:4	F	
12	I	25	W	Full	LOA	2 hrs.	Weak Every 10′	Thin 2 fingers dilated	Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 35-60″, interval 2′	40′	Low forceps	7:8	F	
13	I	25	C	Full	ROP	15′	Weak	Thick 1-2 fingers dilated	Mid pelvis	1 dose 0.5 cc.	Strong, lasting 50-60″, interval 1′	45′	Normal	6:14	M	Pains began after giving of castor oil.
14	I	29	C	8 mos.	LOA	5 hrs. 30′	Weak Every 10-15′	Thick 1-2 fingers dilated	High in pelvis	2 doses 0.5 cc. each	Mod. strong, lasting 30-40″, interval 2′	6 hrs.	Low forceps	4:9½	M	

Case Number	Parity	Age	Color	Term	Position	At Time of Giving Thymophysin: Hours in Labor	Character of Pains	Condition of Cervix	Position of Head in Pelvis	Amount of Thymophysin Given	After Giving Thymophysin: Character of Pains	Duration of Labor	Type of Delivery	Weight of Baby	Sex	Remarks
15	I	21	W	Full	LOP	3 hrs. 45′	Weak Irregular	Thin 1 finger dilated	At brim Unengaged	4 doses 0.5 cc. each	Mod. strong, lasting 30-40″, interval 2′	8½ hrs.	High forceps	7:14	M	Borderline Caesarean case; very much moulding of head.
16	I	17	W	Full	ROP	7 hrs. 15′	Mod. strong Lasting 30″ every 3-4′	Thin 2-3 fingers dilated	Mid pelvis	1 dose 0.5 cc.	Strong, lasting 40-50″, interval 2′	7 hrs. 29′	Normal	6:6½	F	
17	I	23	W	Full	LOP	25′	Weak Lasting 10″	Thick No dilatation	At brim Unengaged	3 doses 0.5 cc. each	Very strong, lasting 60-90″, interval 5′	9 hrs. 45′	Low forceps	7:2	F	
18	I	22	W	Full	LOP	4 hrs.	Weak Irregular	Thick 1 finger dilated	High Mid pelvis	2 doses 0.5 cc. each	Strong, lasting 30-40″, interval 3-5′	16 hrs. 20′	Mid forceps	7:14	M	
19	I	22	W	Full	LOA	8 hrs. 15′	Weak Every 10-15′	Thick 2 fingers dilated	Mid pelvis	2 doses 0.5 cc. each	Strong, lasting 30-50″, interval 2-4′	5 hrs. 35′	Mid forceps	7:11½	M	
20	I	17	W	Full	LOA	3 hrs. 30′	Weak Irregular	Thick 2 fingers dilated	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50-60″, interval 1-2′	1 hr. 3′	Normal	8:1	M	
21	II	30	W	Full	ROA	3 hrs. 50′	Mod. strong Lasting 25″ every 3-4′	Thin 4-5 fingers dilated	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50″, interval 1′	29′	Normal	6:6	M	
22	II	19	W	5 mos.	Br'ch	1 hr. 5′	Irregular Cramps	Thick No dilatation	Not felt	1 dose of 1 cc., 1 of 0.5 cc.	Mod. strong, lasting 25-60″, interval 2-5′	2 hrs. 15′	Normal	—	N	
23	II	24	W	Full	LOA	3 hrs. 15′	Weak Every 5-6′	Thick 1-2 fingers	High Mid pelvis	2 doses 0.5 cc. each	Strong, lasting 30-40″, interval 2′	1 hr. 59′	Normal	7:10	F	
24	II	26	W	Full	LOA	9 hrs.	Weak Every 15′	Thin 1 finger	At brim	2 doses 0.5 cc. each	Strong, lasting 50-60″, interval 1′	1 hr. 50′	Normal	7:6¼	F	Labor before thymophysin very light, without progress.
25	II	31	W	Full	ROA	2 hrs. 30′	Mod. strong Lasting 25″ every 5′	Mod. thick 2 fingers dilated	Mid pelvis	1 dose 0.5 cc.	Very strong	30′	Normal	8:00	M	
26	II	21	W	Full	LOA	4 hrs. 15′	Weak Every 10-15′	Mod. thick 1 finger	High in pelvis	1 dose 0.5 cc.	Strong, "at short intervals"	1 hr. 1′	Normal	6:8	M	
27	II	26	W	Full	LOA	5 hrs. 30′	Mod. strong Every 5′	Thick 2 fingers	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 40-50″, interval 1-2′	25′	Normal	6:12	F	
28	II	26	W	Full	LOA	4 hrs. 20′	Weak Every 5-10′	Thick 2 fingers	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 40-50″, interval 1-2′	24′	Normal	7:2½	M	

Case Number	Parity	Age	Color	Term	Position	—At Time of Giving Thymophysin— Hours in Labor	Character of Pains	Condition of Cervix	Position of Head in Pelvis	Amount of Thymophysin Given	—After Giving Thymophysin— Character of Pains	Duration of Labor	Type of Delivery	Weight of Baby	Sex	Remarks
29	II	26	W	Full	LOA	2 hrs. 10′	Mod. strong Every 5′	Thick 2 fingers	Mid pelvis	1 dose 0.5 cc.	Very strong	8′	Normal	6:6	F	
30	III	28	W	Full	LOP	2 hrs. 15′	Weak Every 10′	Thick No dilatation	High in pelvis	2 doses 0.5 cc. each	Very strong, lasting 30-90″, interval 1-2′	5 hrs. 20′	Normal	8:10	F	
31	III	23	C	Full	LOA	5 hrs. 10′	Weak Lasting 15-20″ every 10-15′	Mod. thick 2 fingers dilated	Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50-60″, interval 1-2′	24′	Normal	6:12	M	
32	III	25	W	Full	LOA	3 hrs. 15′	Weak Irregular	Thick No dilatation	At brim	2 doses 0.5 cc. each	Mod. strong, lasting 30-40″, interval 2′	3 hrs.	Normal	8:1	M	
33	IV	26	W	Full	ROA	3 hrs. 19′	Weak Lasting 10-15″ every 10-15′	Thick 1-2 fingers dilated	High Mid pelvis	2 doses 0.5 cc. each	Very strong, lasting 50″, interval 2′	1 hr. 57′	Normal	6:14	F	
34	III	26	W	Full	ROP	1 hr. 12′	Weak Lasting 15-20″ every 4′	Thick 2 fingers dilated	Floating above bag	2 doses 0.5 cc. each	Very strong, lasting 50″, interval 2′	3 hrs. 20′	Podalic version, Breech extraction	6:8	M	Induced with Voorhees bag for toxemia.
35	IV	37	W	2½ mos.	—	2 hrs. 15′	Weak Irregular	Thick 1 finger	Not felt	1 dose 1 cc., 1 of 0.5 cc.	Very strong, lasting 45-90″, interval 3-5′	3 hrs. 15′	Normal	—	—	
36	IV	38	W	Full	LOA	40′	Weak Every 10′	Mod. thick 1 finger	At brim	2 doses 0.5 cc. each	Mod. strong, lasting 30-40″, interval 3-4′	2 hrs. 15′	Normal	6:5½	M	
37	IV	28	W	Full	ROA	1 hr. 15′	Weak Every 5-6′	Thick 1-2 fingers	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50-60″, interval 1′	31′	Normal	7:7	F	
38	IV	21	W	Full	LOA	—	Weak Every 10′	Thick 1 finger	High in pelvis	1 dose 0.5 cc.	Strong, lasting 30-40″, interval 2′	50′	Normal	6:14	M	
39	IV	25	W	Full	ROA	6 hrs. 18′	Weak Every 10-15′	Thick 2 fingers	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50-60″, interval 1-2′	36′	Normal	8:8	F	
40	V	36	W	Full	LOA	5 hrs. 50′	Weak Irregular	Fully dilated	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50-60″, interval 1-2′	10′	Normal	7:6	F	Pains became weak after patient was fully dilated.
41	VI	33	W	Full	ROA	1 hr. 45′	Weak Lasting 10-15″ every 10-15′	Thick 2 fingers	High Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 50-60″, interval 1-2′	43′	Normal	8:4½	M	
42	VI	26	W	Full	LOA	5 hrs. 30′	Weak Every 5-17′	Thick 1 finger	Mid pelvis	1 dose 0.5 cc.	Very strong, lasting 45-70″, interval 1′	20′	Normal	6:7½	M	
43	X	39	C	Full	ROP	1 hr. 30′	Weak Every 10-15′	Thick 1-2 fingers dilated	At brim	1 dose 0.5 cc.	Very strong, lasting 30-40″, interval 0.5-1′	1 hr. 46′	Normal	7:11	M	

As can be seen from the above table, the action of the thymophysin was generally very beneficent and effective. Unfortunately, we were unable to see every case immediately after the onset of pains, but in practically every one, the amount of labor preceding the injection of the thymophysin, as evidenced by the character and frequency of the pains and the degree of cervical dilatation present, was very slight. The very favorable effects of its use are seen in the rapidity with which most of the labors ended, without any untoward results for any of the mothers or babies.

Thus, thymophysin can be given very early, as soon as one is assured that labor has started. The pains begin practically at once after injection, and frequently they are so strong that one unaccustomed to the drug might fear a tendency to rupture. They generally last from forty to sixty seconds, and there is an interval of one to two minutes between pains. During this interval there is the same complete relaxation of the uterine musculature as occurs in normal labor, and there was no suggestion of tetany of the uterus in any case. The effect of the drug seems to wear off in about forty-five to sixty minutes, and as a result, we thought it best to use two repeated doses of 0.5 cc. each in most cases in order to secure a prolonged effect. Temesvary advised an initial dose of one cubic centimeter, but Jarcho also preferred two repeated doses of 0.5 cc. in order to lessen the initial powerful effect and to determine personal idiosyncrasy to the action of the drug. In those cases where delivery followed within about one hour of the last injection of thymophysin, there was less bleeding in the third stage of labor than usual, thus indicating that its effect had persisted into the third stage. The preparation is injected intramuscularly, and must be fresh, i.e., if half an ampoule has been used, the other half must be used within six hours or it deteriorates and does not bring about the expected result upon the uterine contractions.

The above table further summarizes the effect of thymophysin in the various groups of cases. It is seen that the general average of the length of labor has been definitely decreased. Most of the posterior positions in the primiparae ended in forceps deliveries, but the total length of time up to full dilatation of the cervix was undoubtedly decreased. A larger series of such cases will determine the exact status of the use of thymophysin in patients with posterior positions.

Thymophysin has no effect upon patients not in labor, hence it is of no value in the induction of labor, and can be used, therefore, to distinguish false from true labor pains. That this is not merely a chance reaction of the patient can be seen from case No. 37, where the patient had entered the hospital several days before complaining of pains. Thymophysin was given without effect and she was sent home. Upon her return in true labor, delivery followed within thirty-one minutes of the administration of thymophysin. The drug is ineffective in patients with uteri tired from a long labor, as can be understood from the description of its action above.‡ Such patients should be rested with morphine and magnesium sulphate, and then be allowed to proceed with labor. Thymophysin was also used in four patients who had been induced with Voorhees bags, two for toxemia, one for placenta previa, and one for strong, irregular, ineffective pains which could not be stopped for several days. It was successful only in one of the toxemia cases, case No. 34. The other toxemia patient and the placenta previa never had any real labor at all, the softening and dilatation of the cervix being purely mechanical. The bags were removed after twenty-four hours and the patients delivered by version and breech extraction. The last case had a long labor of fifteen hours and delivered a small baby weighing only five pounds and two ounces. The only explanation of this result may lie in the generally ineffective use of thymophysin in the absence of regular labor pains, for where pains occurred as in case No. 34, its effect was very good. The drug was also used in four pa-

‡See quotation, p. 771.

AFTER ADMINISTRATION OF THYMOPHYSIN*

	Primiparae		Multiparae	
	Anterior Position	Posterior Position	Anterior Position	Posterior Position
Total number of cases	10	8	17	2
Minimum time of delivery	40 minutes	45 minutes	8 minutes	3 hours 20 minutes
Maximum time of delivery	6 hours	9 hours 45 minutes	3 hours	5 hours 20 minutes
Average time of delivery	2 hours 37 minutes	4 hours 23 minutes	1 hour	4 hours 20 minutes
Normal deliveries	4	2	17	2
Forceps deliveries	6	6	0	0

*Only cases where cervical dilatation was two fingers or less are included in the calculations. The two borderline Caesarean cases are excluded.

tients with almost complete dilatation of the cervix, in whom the pains were becoming very weak and progress was very poor. All four delivered within less than one-half hour after the injection of the thymophysin.†

Temesvary[2] himself recommends thymophysin for use in marginal placenta previa following rupture of the membranes, for dry labor, for elderly primiparae, for some cases of eclampsia, and for contracted pelvis. We have used thymophysin in the case of four primiparae where the head was unengaged, cases No. 3, 7, 15, 17, with good results. We believe that cases No. 7 and 15 might possibly have had to be delivered by Caesarean section had not the strength of the pains been greatly increased by the thymophysin, thus inducing more effective moulding of the head. It can thus be used to secure a good trial of labor in borderline cases, under the watchful eyes of the attending obstetrician, before deciding upon Caesarean section. With reference to contraindications, they would seem to be any malposition or disproportion, and renal and cardiac cases.

In closing, I wish to express my thanks to Dr. William A. Ham, the chief of our service, for permission to study this series of cases. I also wish to thank those members of the staff who allowed me to use the thymophysin on their private cases. Finally, I wish to express my deep appreciation to Dr. L. Woodruff, our obstetrical resident, and to Drs. W. Murphy and L. Alpert, our internes, and to the nursing staff for their splendid coöperation in carrying out this work.

SUMMARY

1) Thymophysin can be given as soon as regular labor is established.
2) There is apparently no danger of tetanic contraction of the uterus.
3) Thymophysin definitely shortens labor.
4) It can be given for secondary inertia of the uterus, if the patient is not too fatigued.
5) The preferable dosage is 0.5 cc. repeated in 45 to 60 minutes.
6) There seems to be no danger of injury to mother or child.
7) With careful watching, it can be used to give a good trial of labor to borderline Caesarean cases.
8) It does not seem to be effective in inducing labor, hence can be used to differentiate true from false labor.

CASE REPORTS

1) Para I, age 29, white, full term; general physical condition good. Pains began at 5 P. M. on June 4, 1930. At 2:30 A. M. on June 5 rectal examination showed the cervix thin, three fingers dilated, the head in mid-pelvis, membranes intact, pains coming every five minutes and of fairly good quality. At 11:20 A. M. rectal examination showed the cervix thin, 4-5 fingers dilated, head in mid-pelvis, membranes intact; pains every five minutes and lasting 25 seconds. Patient becoming tired. Given 0.5 cc. thymophysin at 11:30 A. M. Pains began to come at intervals of two minutes, lasting 50-55 seconds, and much stronger than the previous pains, according to the patient. The head came down to the perineum in one-half hour. Given another 0.5 cc. thymophysin at 12:06 P. M. and pains again became stronger. Delivered normally of a male at 12:29 P. M.

2) Para I, age 26, white, full term; general physical condition good. Began to have slight pains about 1:30 A. M., when rectal examination showed the cervix thick, one finger dilated, head high in pelvis, membranes intact, pains irregular. At 11:30 A. M. rectal examination showed the cervix somewhat thinner, about two fingers dilated, head in the same position, membranes intact, pains weak, every five minutes, lasting 15-20 seconds. Given 0.5 cc. thymophysin at 11:35 A. M. Pains at once became very strong, lasting 40-45 seconds with an interval of 1.5 minutes between pains. At 12:10 P. M. rectal examination showed the cervix thin, somewhat over three fingers dilated, head in mid-pelvis. Membranes ruptured at 12:15 P. M. Another 0.5 cc. thymophysin given at 12:30 P. M. when the pains began to slow down. At 12:55 P. M. the cervix was fully dilated. Delivered normally of a female at 1:50 P. M.

3) Para I, age 26, white, full term; general physical condition good. Began to have pains at 7:30 A. M. on June 7, 1930. Rectal examination at 8:30 A. M. showed the cervix thick, one finger dilated, head at the brim and unengaged, membranes intact, pains slight, every 15-20 minutes. Blood pressure 146/90. Some oedema of legs present. Rectal examination at 11:15 A. M. showed the same findings as above; pains every 7-8 minutes. Rectal examination at 12:20 P. M. disclosed no change; pains every 4-5 minutes, lasting thirty seconds. Given 0.5 cc. thymophysin at 12:21 P. M. Pains at once became very strong, lasting 50-60 seconds and coming every minute. Membranes ruptured at 12:26 P. M. Rectal examination at 1:00 P. M. showed slightly more dilatation and thinning of the cervix; head still at brim. Pains began to come at intervals of three to four minutes and so another 0.5 cc. of thymophysin was given at 1:35 P. M. Pains again began to come with previously mentioned strength and frequency. At 2:15 P. M. rectal examination showed full dilatation of the cervix, the head in mid-pelvis. Delivered of a male by mid-forceps at 3 P. M. Baby had a very large head. It also had an imperforate anus which was successfully operated upon by Dr. Harry J. Lee.

4) Para I, age 31, white, full term; general physical condition good. Pains began at 9:05 A. M. Rectal examination at 11:00 A. M. showed the cervix moderately thick, 2 fingers dilated, head high in pelvis, membranes ruptured (at 7 A. M.), pains weak, lasting 10-15 seconds, every 10-15 minutes. Given 0.5 cc. thymophysin at 11:05 A. M. Pains at once became stronger, lasting 40 seconds, every 1.5 minutes. Rectal at 11:30 A. M. showed

†The detailed histories of the last seven cases referred to above have not been included in this report.

the cervix thinner, three fingers dilated, head high mid-pelvis. Another 0.5 cc. thymophysin given at 11:45 A. M. and the pains increased in strength, lasting 60 seconds with an interval of one minute between pains. Rectal examination at 12:25 P. M. showed the cervix to be fully dilated and the head in mid-pelvis. Delivered of a male by mid-forceps at 1:05 P. M. The head remained in persistent posterior position and was rotated manually at the time of delivery.

5) Para I, age 25, white, full term; general physical condition good. Patient entered the hospital at 1:45 A. M. complaining of slight irregular pains. Rectal examination showed the cervix to be moderately thin, 1-2 fingers dilated, head high in the pelvis. At 1:30 P. M. rectal examination showed the cervix to be of the same thickness, two fingers dilated, head in the same position, membranes intact, pains weak, lasting 15 seconds, coming every 5-6 minutes. At 2:13 P. M. 0.4 cc. thymophysin was given. Pains at once became very strong, lasting 50-60 seconds, with an interval of one minute between pains. At 3:20 P. M. the cervix was fully dilated, head in mid-pelvis; pains slowed down to 3-4 minute intervals. At 3:55 P. M. the head was in low mid-pelvis. The head remained in persistent posterior position and was rotated with Kielland forceps and delivery of a male took place at 4:45 P. M. by low forceps. The patient died of a pulmonary embolus on the delivery table during the delivery of the body of the child.

6) Para I, age 24, white, full term; general physical examination good. (Had had hyperthyroidism.) Membranes ruptured at 8:30 P. M. on June 13, 1930. At 11 P. M. the patient began to have slight pains every 10-15 minutes, and rectal examination showed the cervix thick, 1-2 fingers dilated, head high mid-pelvis. Given 0.5 cc. thymophysin at 11:50 P. M. Pains at once became strong, lasting 50-90 seconds, with interval of 0.5-1 minute between pains. Pains continued strong but interval increased to 2-3 minutes at the end of an hour. Rectal examination at 1 A. M. showed the cervix thin, 3-4 fingers dilated, head low mid-pelvis. Given another 0.5 cc. thymophysin at 1:05 A. M. Pains returned to previously mentioned strength and frequency. At 1:25 A. M. the cervix was fully dilated, head visible at introitus at 1:40 A. M. Patient had somewhat narrow arch and outlet. Delivered of a male by low forceps at 2:30 A. M.

7) Para I, age 18, white, full term; general physical condition good. Membranes ruptured at 1 P. M. on June 13, 1930. About midnight the patient began to have slight pains every 10 minutes. Rectal examination showed the cervix thick, no dilatation present, head at the brim, unengaged, not felt by examining finger in rectum. Given 0.5 cc. thymophysin at 12:50 A. M. Pains at once became strong, lasting 40-60 seconds, with an interval of 1-2 minutes between pains. Pains began to come at intervals of 4-5 minutes at the end of an hour. Another 0.5 cc. of thymophysin was given at 2:00 A. M. and pains returned to previously mentioned strength and frequency. Rectal examination at 3:30 A. M. showed the cervix thinner, softer, 1-2 fingers dilated, head in high mid-pelvis. Given another 0.5 cc. thymophysin at 3:40 A. M. and pains returned to previous strength and frequency. At 3:50 A. M. given one-quarter grain of morphine plus one ampoule of 2 cc. of 50% magnesium sulphate, the latter being repeated at 4:50 A. M. The pains quieted down to five minute intervals, their strength decreased, and the patient slept between pains. Rectal examination at 10:10 A. M. showed the cervix thinner, 2-3 fingers dilated, head in high mid-pelvis. Given another 0.5 cc. thymophysin at 10:20 A. M. Pains again returned to earlier strength and frequency. Rectal at 12:40 P. M. showed cervix almost fully dilated, head in same position. No further progress was made. Vaginal examination at 1:40 P. M. confirmed above findings, including persistent posterior position of head. Head rotated manually and delivery of a male by high forceps took place at 2:10 P. M. We feel that this case was a borderline Caesarean, and that the thymophysin gave us a very good indication of the possibility of vaginal delivery through the increased moulding of the head caused by the very powerful pains induced by the drug.

8) Para I, age 29, white, full term; general physical condition good. Patient began to have slight pains at 5 A. M. Rectal examination at 9:00 A. M. showed the cervix thick, 1 finger dilated, head high in pelvis, pains weak, lasting 15 seconds, coming every fifteen minutes. Given 0.5 cc. thymophysin at 9:20 A. M. Pains became stronger, lasting 30-50 seconds, with intervals of 2-3 minutes between pains. Rectal examination at 10:20 A. M. showed the cervix thinner, 2-3 fingers dilated, head somewhat lower. Another 0.5 cc. thymophysin given at 10:30 A. M. Pains again began coming strongly every 2-3 minutes. At 11:00 A. M. the cervix was fully dilated, head in low mid-pelvis. No progress made, the head remaining in persistent posterior position. Head rotated manually. Delivery of a male by mid-forceps took place at 12:40 P. M.

9) Para I, age 24, white, full term; general physical examination good. Membranes ruptured at 9:50 A. M. Patient began to have slight pains at about noon. Rectal examination at 2 P. M. showed the cervix thick, about two fingers dilated, head high in the pelvis, pains weak, coming every 10 minutes. Given 0.5 cc. thymophysin at 2:35 P. M. Pains at once became strong, lasting 40-45 seconds, with an interval of 2-3 minutes between pains. Rectal examination at 3:20 P. M. showed the cervix to be fully dilated, head in low mid-pelvis. Given another dose of 0.5 cc. thymophysin at 3:30 P. M. Head appeared at vulva at 3:40 P. M. Patient delivered normally of a male at 4:05 P. M.

10) Para I, age 24, white, full term; general physical condition good. Patient began to have slight, irregular cramps at noon on June 15, 1930. The pains became regular and harder late at night. Rectal examination at 5:15 A. M. on June 16 showed the cervix thick, two fingers dilated, head in mid-pelvis, pains lasting 30 seconds and coming every 5 minutes. Given 0.5 cc. thymophysin at 5:30 A. M. Pains became very much harder, lasting 50 seconds, with an interval of one minute between pains. Head was down on the perineum at 6:10 A. M. Delivered normally of a male at 6:20 A. M.

11) Para I, age 19, white, full term; general physical condition good. Patient began to have slight pains at 12:15 A. M. Rectal examination at 3:30 A. M. showed the cervix thick, one finger dilated, head high in pelvis, membranes intact, pains weak, coming every 8-10 minutes. Given 0.5 cc. thymophysin at 4:30 A. M. Pains became very strong, lasting one minute, with an interval of one minute between pains. Pains gradually decreased to intervals of 4-5 minutes between pains. Another 0.5 cc. of thymophysin was given at 5:50 A. M. Pains again returned to previously mentioned strength and frequency. Cervix fully dilated at 6:15 A. M., head down on the perineum. Delivered of a female by low forceps at 7:15 A. M.

12) Para I, age 25, white, full term; general condition good. Pains began at 10 A. M. Rectal examination at 11:50 A. M. showed the cervix thin, 2 fingers dilated, head in mid-pelvis, pains weak, coming every 10 minutes. Given 0.5 cc. thymophysin at 12 noon. Pains at once began to come strongly, lasting 35-60 seconds, with intervals of 2 minutes between pains. Head on perineum at 12:25 P. M. Delivered of a female by low forceps at 12:40 P. M.

13) Para I, age 25, colored, full term; general physical condition good. Membranes ruptured at 9:30 P. M. Patient entered hospital having no pains. Given two ounces of castor oil at 10:00 P. M. Pains began at 10:45 P. M. Rectal examination showed the cervix thick, 1-2 fingers dilated, head in mid-pelvis, pains weak. Given 0.5 cc. thymophysin at 11 P. M. Pains began at once to come very strongly, lasting 50-60 seconds, with intervals of one minute between pains. Delivered normally of a male at 11:45 P. M.

14) Para I, age 29, colored, 8 months; general physical condition good. Slight pains began at about 2 P. M. Rectal examination at 7:30 P. M. showed the cervix thick, 1-2 fingers dilated, pains weak, coming every 10-15 minutes. Given 0.5 cc. thymophysin at 7:35 P. M. Pains came stronger, lasting 30-40 seconds, with intervals of 2 minutes between pains, but gradually slowed down to intervals of 4-5 minutes. Rectal examination at 10 P. M. showed the cervix thin, 3 fingers dilated, head in mid-pelvis. Given another 0.5 cc. thymophysin at 10:30 P. M. and pains returned to previous strength and frequency. Fully dilated at 1:00 A. M. Delivered of a male by low forceps at 1:30 A. M.

15) Para I, age 21, white, full term; general physical condition good. Having irregular pains since 6:00 A. M. Rectal examination at 9:30 A. M. showed the cervix thin, one finger dilated, head at brim, unengaged, pains weak and irregular. Given 0.5 cc. thymophysin at 9:45 A. M. Pains began to come strongly at once, lasting 30-40 seconds, and coming every three to four minutes. At the end of an hour the pains slowed down to 6-7 minute intervals. Given another 0.5 cc. thymophysin at 10:45 A. M. and pains returned to previous strength and frequency. They slowed down again and another dose of 0.5 cc. thymophysin was given at 11:55 A. M. Pains became stronger, lasting 40-60 seconds and coming at intervals of 1-2 minutes. Rectal examination at 1:00 P. M. showed the cervix thin, 2 fingers dilated, head still at brim. Vaginal examination at 2:30 P. M. showed the cervix thin, 3 fingers dilated, head moulded high into the pelvis, pains coming at five minute intervals. Dose of 0.5 cc. thymophysin repeated at 2:45 P. M. Pains became stronger, lasting 40-50 seconds, coming at three minute intervals, but slowed down again at the end of 30 minutes. Rectal examination at 4:00 P. M. showed the cervix thin, 3-4 fingers dilated, head high in pelvis. At 5:15 P. M. the patient was anesthetized and prepared for delivery. Examination showed the cervix almost fully dilated. The membranes were ruptured artificially and the head was found in persistent LOP. It was rotated manually to an anterior position, high forceps applied and delivery of a male was accomplished with some difficulty at 5:45 P. M. We believe that this patient also would undoubtedly have had to have a Caesarean section had not the head been moulded into the pelvis by the strong pains induced by the thymophysin.

16) Para I, age 17, white, full term; general physical condition good. Patient began to have irregular pains at 2 P. M. Rectal examination at 7:30 P. M. showed the cervix moderately thin, 2 fingers dilated, head in mid-pelvis, pains slight, coming every 3-4 minutes. Given 0.5 cc. thymophysin at 9:15 P. M. Pains became very much stronger, lasting 40-50 seconds, with intervals of two minutes between pains. Pains continued hard every 3-5 minutes until the normal delivery of a female at 4:54 A. M. This patient was very uncoöperative, refused repetition of thymophysin, refused to stay in bed, and wished to sign a release and leave the hospital while in very hard labor.

17) Para I, age 23, white, full term; general physical condition good. Membranes ruptured at 12:15 A. M., but the patient was having no pains. Given two ounces of castor oil at 11 A. M. and began to have pains shortly thereafter. Rectal examination showed the cervix thick, no dilatation present, head at brim, unengaged, pains weak. Given 0.5 cc. thymophysin at 11:55 A. M., but pains did not change much in character, except for slight increase in strength. Another 0.5 cc. thymophysin was given at 1:05 P. M. Pains became very much stronger in character, lasting 60-90 seconds, at intervals of five minutes. Pains slowed down somewhat at the end of two hours, and another 0.5 cc. thymophysin was given at 3:23 P. M. The pains began coming every three minutes and lasted 30-40 seconds. They slowed down again at the end of an hour and continued to come at five minute intervals until delivery. Rectal examination at 3:25 P. M. showed the cervix moderately thick, 2-3 fingers dilated, head in high mid-pelvis. Rectal examination at 8:45 P. M. showed the cervix thin, almost fully dilated, head in low mid-pelvis. Delivered of a female by low forceps at 9:40 P. M.

18) Para I, age 22, white, full term; general physical condition good. Patient began having irregular pains at 10:00 A. M. Rectal examination at 1:30 P. M. showed the cervix thick, one finger dilated, head in high mid-pelvis, pains weak and irregular. Given 0.5 cc. thymophysin at 2:00 P. M. Pains began to come at five minute intervals, lasting 30-40 seconds, and much stronger than before. Interval between pains gradually increased,

but the pains remained strong. Rectal examination at 3:05 P. M. showed the cervix slightly thinner, 2 fingers dilated, head in mid-pelvis. Given another 0.5 cc. thymophysin at 3:15 P. M., and pains began to come at two minute intervals, lasting 30-40 seconds, but gradually became weaker. Vaginal examination at 8:30 P. M. showed cervix to be still thick, 3 fingers dilated, head in mid-pelvis in LOP.

Rectal examination at 11:30 P. M.—cervix thick, 3 fingers dilated, head in mid-pelvis.

Rectal examination at 1:30 A. M.—cervix thinner, 3 fingers dilated, head in mid-pelvis.

Rectal examination at 4:30 A. M.—cervix thinner, 4 fingers dilated, head in mid-pelvis.

The patient had been given a quarter grain of morphine and 2 cc. of 50% magnesium sulphate intramuscularly at 9:00 P. M., the latter being repeated at 11:30 P. M., and she had received a moderate amount of relief from pain from these injections. The head remained in the posterior position, and she was delivered by the Scanzoni maneuver and mid-forceps of a male at 6:25 A. M.

19) Para I, age 22, white, full term; general physical condition good. Pains began at about 3:00 A. M. Rectal examination at 10:30 A. M. showed the cervix thick, two fingers dilated, head in mid-pelvis, pains weak, coming every 10-15 minutes. Given 0.5 cc. thymophysin at 11:15 A. M. Pains became much harder, lasting 30-50 seconds, with intervals of 2-4 minutes between pains. Rectal examination at 12:20 P. M. showed the cervix still thick, two fingers dilated, head in mid-pelvis. Given another 0.5 cc. thymophysin at 12:30 P. M. Rectal examination at 3:15 P. M. showed the cervix fully dilated, the head in mid-pelvis. Delivered of a male by mid-forceps at 4:50 P. M.

20) Para I, age 17, white, full term; general physical condition good. Pains began at 4:30 P. M. At 7:50 P. M. rectal examination showed the cervix thick two fingers dilated, head in high mid-pelvis, pains weak and irregular. Given 0.5 cc. thymophysin at 8:00 P. M. Pains became very strong, lasting 50-60 seconds, with intervals of 1-2 minutes between pains. The membranes ruptured at 8:08 P. M. Patient was delivered normally of a male at 9:03 P. M.

21)* Para II, age 30, white, full term; general physical condition good. Patient entered the hospital at 8:30 P. M., having slight, irregular pains in the back. Rectal examination showed the cervix thick, two fingers dilated, head high in the pelvis, membranes intact. At 12:20 A. M. rectal examination showed the cervix thin, 4-5 fingers dilated, head in high mid-pelvis, pains moderately strong, lasting 25 seconds each, but no desire to push down was present. At 12:30 A. M. 0.5 cc. of thymophysin was given. The pains at once increased in severity, lasting 50 seconds each, with an interval of one minute between pains. The head came down to the perineum in eight minutes, and the patient was delivered normally of a male at 12:43 A. M.

During previous labor she had pains all day, but had hard pain only for the last 3-4 hours. Delivery was normal.

22)* Para II, age 19, white, 5 months; general physical condition good. Patient's membranes ruptured on June 1, 1930. Since then she had not felt motion. She had cramps every afternoon, but not in the morning. On June 5 she began to have weak, irregular cramps at 12:30 P. M. The cervix was thick, firm, with practically no dilatation present; presenting part not felt. Given 1 cc. thymophysin at 1:35 P. M. Pains at once began coming every five minutes, lasting 25-30 seconds. Rectal examination at 2:15 P. M. showed the cervix still thick, 1-2 fingers dilated, presenting part in mid-pelvis. Given another 0.5 cc. at 2:20 P. M. Pains became stronger, lasting 30-60 seconds, with an interval of two minutes between pains. Rectal examination at 3:40 P. M. showed the cervix thinner, 3-4 fingers dilated. Patient suddenly began to bear down and the foetus appeared at the vulva, presenting by the buttocks. Delivery completed at 3:45 P. M., the placenta following at 3:45 P. M.

The patient's previous labor had been very hard and long, ending in a difficult high forceps delivery of a full term female.

23) Para II, age 24, white, full term; general physical condition good. Patient began to have slight pains at about noon. Rectal examination at 3:00 P. M. showed the cervix thick, 1-2 fingers dilated, head in high mid-pelvis pains weak, coming every 5-6 minutes. Given 0.5 cc. thymophysin at 3:15 P. M. Pains at once became stronger, lasting 30-40 seconds, with an interval of two minutes between pains. At 3:45 P. M. the pains were lasting 45-50 seconds, with an interval of one minute between pains. Rectal examination at 4:00 P. M. showed the cervix thinner, 3 fingers dilated, head in high mid-pelvis. Another 0.5 cc. thymophysin given at 4:30 P. M. Rectal examination at 4:45 P. M. showed the cervix fully dilated, the head on the perineum. Patient was delivered normally of a female at 5:14 P. M.

Previous labor had lasted 11 hours and 20 minutes, ending in a low forceps delivery.

24) Para II, age 36, white, full term; general physical condition good. Patient began to have slight pains at 2:00 A. M. Rectal examination at 8:30 A. M. showed the cervix thin, practically no dilatation, head at brim, pains weak, coming every 15 minutes. Pains stopped after entry to hospital and began again at 11:00 A. M. when rectal examination showed the same findings as above. Given 0.5 cc. thymophysin at 11:05 A. M. Pains began to come at once very strongly, lasting 50-60 seconds, with an interval of one minute between pains. Rectal examination at 11:39 A. M. showed the cervix about 2 fingers dilated, the rest of the findings unchanged, the patient having slight bloody show. Pains slowed down to two minute intervals at noon, when another 0.5 cc. thymophysin was given. Pains at once returned to previous strength and frequency. Membranes ruptured at 12:05 P. M. Rectal examination at 12:15 P. M. showed the cervix almost fully dilated, the head in low mid-pelvis. Patient delivered normally of a female at 12:50 P. M.

*Cases with the mark * are those where the history of previous labors was secured from the patient alone. All cases *without* this mark are where the history of previous labors was secured from the hospital records of the labor.

Previous labor, according to her attending physician, had been harder and longer.

25)* Para II, age 31, white, full term; general physical condition good. Membranes ruptured at 9:00 P. M. and pains began shortly thereafter. Rectal examination at 11:45 P. M. showed the cervix moderately thick, about 2 fingers dilated, the head in mid-pelvis, pains moderately strong, lasting 25 seconds and coming every 5 minutes. Given 0.5 cc. thymophysin at midnight. Pains at once became very strong and the head was on the perineum in 15 minutes. Patient delivered normally of a male at 12.34 P. M.

Previous labor had lasted about 14 hours after entry to hospital ending in a forceps delivery.

26)* Para II, age 21, white, full term; general physical condition good. Patient began to have slight pains at 8:00 P. M. Rectal examination at 11:00 P. M. showed the cervix thick, 1 finger dilated, head high in pelvis, pains weak, coming every 10-15 minutes. Given 0.5 cc. of old thymophysin at 11:05 P. M. without effect. Rectal examination at midnight showed the cervix slightly thinner, but the rest of the findings were the same. Given 0.5 cc. thymophysin at 12:15 P. M. Pains at once became very strong, coming at very short intervals. Delivered normally of a male at 1:16 A. M.

Previous labor had been very much longer, ending in a forceps delivery.

27) Para II, age 26, white, full term; general physical condition good. Patient began to have pains at 9:00 A. M. At 2:00 P. M. rectal examination showed the cervix thick, two fingers dilated, the head in high mid-pelvis, pains moderately strong, coming every 5 minutes. Given 0.5 cc. thymophysin at 2:30 P. M. Pains at once became very much stronger, lasting 40-50 seconds, with intervals of 1-2 minutes. The head came down to the perineum at 2:45 P. M. Patient delivered normally of a female at 2:35 P. M.

Previous labor had lasted 26 hours, ending in a normal delivery.

28)* Para II, age 26, white, full term; general physical condition good. Pains began at 11:00 A. M. Rectal examination at 3:00 P. M. showed the cervix thick, two fingers dilated, the head in high mid-pelvis, pains weak, coming every 5-10 minutes. Given 0.5 cc. thymophysin at 3:20 P. M. Pains at once became very hard, lasting 40-50 seconds, with an interval of 1-2 minutes between pains. Patient delivered normally of a male at 3:44 P. M.

Previous labor lasted 6-7 hours.

29)* Para II, age 26, white, full term; general physical condition good. Pains began at 10:00 P. M. Rectal examination at 11:50 P. M. showed the cervix thick, 2 fingers dilated, the head in mid-pelvis, pains moderately strong, coming every 5 minutes. Given 0.5 cc. thymophysin at 12:10 A. M. Pains became very strong. Patient delivered normally of a female at 12:18 A. M.

Previous labor, according to attending physician, had been very much longer.

30) Para III, age 28, white, full term; general physical condition good. Patient began to have slight pains at 5:00 A. M. Rectal examination at 7:00 A. M. showed the cervix thick, no dilatation, the head high in the pelvis, membranes intact, pains weak, coming every 10 minutes. Given 0.5 cc. thymophysin at 7:15 A. M. Pains increased in severity, lasting 30-90 seconds, with intervals of 1-2 minutes between pains. Began to have moderately bloody discharge in a short time. Rectal examination at 9:05 A. M. showed some thinning of the cervix, with two fingers of dilatation, head in same position. Another 0.5 cc. thymophysin was given at 9:45 A. M. Pains returned to previous strength and frequency. Membranes ruptured at 10:10 A. M. Rectal examination at 11:15 A. M. showed the cervix thin, three fingers dilated, the head in mid-pelvis. Given another .25 cc. after this examination, and the pains increased from a frequency of 3-4 minutes to 2 minute intervals. Rectal examination at 12:20 P. M. showed the cervix fully dilated, the head in low mid-pelvis. Patient delivered normally of a female at 1:05 P. M.

Previous labors:

a) 8-month pregnancy, normal labor lasting 12 hours.

b) twins, the first was a high forceps and the second was delivered by version and breech extraction. Labor lasted five and one-half hours.

31) Para III, age 23, colored, full term; general physical condition good. Pains began at 5:00 P. M. Rectal examination at 9:40 P. M. showed the cervix soft, moderately thick, two fingers dilated, the head in mid-pelvis, pains weak, lasting 15-20 seconds, coming every 10-15 minutes. Patient given 0.5 cc. thymophysin at 10:10 P. M. Pains at once became very much stronger, lasting 50-60 seconds, with intervals of 1-2 minutes. Membranes ruptured at 10:25 P. M., the head came down to the perineum at 10:30 P. M. Delivered normally of a male at 10:34 P. M.

Previous labors:

a) lasted 16 hours, ending in mid-forceps.

b) lasted 14 hours, ending in mid-forceps.

32) Para III, age 25, white, full term; general physical condition good. Patient had been having irregular pains since 7:00 A. M. Rectal examination at 10:00 A. M. showed the cervix thick, no dilatation present, the head at brim, pains weak and irregular. Given 0.5 cc. thymophysin at 10:15 A. M. Pains became stronger and more regular, lasting 30-40 seconds, with intervals of two minutes between pains. Interval increased to 5 minutes at the end of an hour. Rectal examination at 11:20 A. M. showed the cervix somewhat thinner and softer, one finger dilated, the head in the same position. Patient given another 0.5 cc. thymophysin at 11:30 A. M. Pains increased in strength, lasting 30-40 seconds, with an interval of one minute between pains. Rectal examination at 12:50 P. M. showed the cervix almost fully dilated, the head in midpelvis. Patient delivered normally of a male at 1:30 P. M.

Previous labors:

a) normal delivery, lasting 7 hours, 30 minutes.

b) normal delivery, lasting two hours.

33)* Para IV, age 26, white, full term; general physical condition good. Pains began at 9:00 P. M. Rectal examination at midnight

showed the cervix thick, 1-2 fingers dilated, the head in high mid-pelvis, pains weak, lasting 10-15 seconds, coming every 10-15 minutes. Patient given 0.5 cc. thymophysin at 12:19 A. M. Pains at once became stronger, lasting 50 seconds, with intervals of two minutes between pains, and continued to be strong. Rectal examination at 1:25 A. M. showed the cervix to be somewhat thinner, about 2-3 fingers dilated, the head in the same position. Patient given another 0.5 cc. thymophysin at 1:30 A. M. Pains increased in strength and frequency. Head came down to the perineum at 2:05 A. M. Delivered normally of a female at 2:16 A. M.

Previous labors had all been much longer.

34) Para IV, age 26, white, full term; general physical condition good. Patient had been treated for toxemia of pregnancy, her blood pressure running around 180/130. She was induced with a Voorhees bag at 1:15 P. M., the cervix being very firm, thick, and just admitting one finger. The bag ruptured at the neck at 1:40 P. M. The patient was rebagged at 3:00 P. M., the condition of the cervix being the same. Pains began at 4:00 P. M. Rectal examination at 5:05 P. M. showed the cervix still thick, about 2 fingers dilated, pains weak, lasting 15-20 seconds, and coming every 4 minutes. Patient given 0.5 cc. thymophysin at 5:12 P. M. Pains at once began to come very strongly, lasting 50 seconds, with intervals of 2 minutes between pains. Another 0.5 cc. thymophysin was given at 5:45 P. M., when the pains had begun to slow down, and the pains became stronger again. At 6:00 P. M. rectal examination showed the cervix softer and thinner, 2-3 fingers dilated, the bag about one-half way out, the anterior lip somewhat edematous. The bag was expelled at 6:50 P. M. At 8:00 P. M. the cervix was almost fully dilated, the head high in the pelvis, cord felt below the head by the finger in the rectum, foetal heart good, membranes intact. The patient was anesthetized, and the findings were confirmed on vaginal examination, the head being in ROP. A podalic version and breech extraction were performed, forceps being applied to the aftercoming head. Delivery completed at 8:32 P. M.

Previous labors:

a) lasted 16 hours, ending in high forceps.
b) Bag induction for toxemia, lasted 12 hours 20 minutes, ending normally.

35) Para IV, age 37, white, two and one-half months pregnant; general physical condition good. Was hanging clothes in her back yard when she reached for a rope high above her head. The rope broke and she fell to the ground. A few hours later, at 4:00 P. M., her membranes ruptured. At 4:30 P. M. she began to have slight cramps. She soon began to flow profusely and passed some clots. On entry to the hospital at 6:30 P. M., her general condition appeared good; temperature normal, pulse 84, blood pressure 108/54. Rectal examination showed the cervix thick, barely admitting one finger; presenting part not felt; pains weak and irregular. Given 0.5 cc. thymophysin at 6:45 P. M. Pains became stronger and more regular, lasting 40-50 seconds, coming at 5 minute intervals. Flowing stopped after the administration of thymophysin. Another 0.5 cc. thymophysin was given at 8:00 P. M. Pains increased in strength, lasting 45-90 seconds, with 3 minute intervals between pains. Passed foetus and portions of placenta at 10:00 P. M. A few more shreds of placenta were removed with a placenta forceps, and curettage showed the uterus to be clean. No flowing from the time of delivery on.

Previous labors:

a) miscarriage at 8 months—labor of 8 hours.
b) normal at term—lasting 6 hours.
c) normal at term—lasting 12 hours, 30 minutes.

36) Para IV, age 38, white, full term; general physical condition fair. Patient has a moderately severe secondary anemia. Membranes ruptured at 8:30 A. M., but no pains followed. Given two ounces of castor oil at 11:15 A. M. Pains began about noon. Rectal at 12:40 P. M. showed the cervix moderately thick, one finger dilated, the head at the brim, pains weak, coming every 10 minutes. Given 0.5 cc. thymophysin at 12:50 P. M. Pains at once became stronger, lasting 30-40 seconds, coming at 3-4 minute intervals. Pains slowed down to 5-6 minute intervals at the end of an hour. Given another 0.5 cc. thymophysin at 1:50 P. M., and the pains returned to previous strength, coming at 2 minute intervals. Rectal examination at 3:15 P. M. showed the cervix slightly thinner, 3 fingers dilated, the head in high mid-pelvis. The patient was given an ampoule of 2 cc. 50% magnesium sulphate. as she was becoming tired. Pains continued strong and frequent. Patient delivered normally of a male at 4:05 P. M.

Previous labors:

a) lasted 11 hours, ending in a high forceps.
b) lasted 14 hours, ending in a high forceps.
c) lasted 25 hours, ending normally.

37)* Para IV, age 28, white, full term; general physical condition good. Membranes ruptured at 6:00 A. M. Pains began at about 6:45 A. M. Rectal examination at 7:45 A. M. showed the cervix thick, 1-2 fingers dilated, the head in high mid-pelvis, pains weak, coming every 5-6 minutes. Patient given 0.5 cc. thymophysin at 8:00 A. M. Pains immediately became very strong, lasting 50-60 seconds, with an interval of one minute between pains. The head came down to the perineum in 25 minutes. Patient delivered normally of a female at 8:31 A. M.

This patient had come into the hospital five days previously having irregular pains. She had received two doses of thymophysin without any effect. She had also received a dose of two ounces of castor oil, following which she had some more irregular pains. She was again given a dose of thymophysin without effect. The pain quieted down the next day, and she was sent home with a diagnosis of false labor. This case illustrates that thymophysin will not have any effect on patients not in labor, a fact already reported by previous investigators.

Previous labors:

a) normal, lasting 18 hours.
b) normal, lasting 4-5 hours.
c) normal, lasting 6 hours.

38) Para IV, age 21, white, full term; general physical condition good. Patient had been having slight pains every one-half to one hour during the day. Rectal examination at 11:15 A. M. showed the cervix thick, one finger dilated, the head high in the pelvis, pains weak, coming every 10 minutes. The membranes ruptured during the rectal examination. Given 0.5 cc. thymophysin at 11:40 A. M. Pains became very strong, lasting 30-40 seconds, with interval of 2 minutes between pains. Patient delivered normally of a male at 12:30 P. M.
Previous labors:
a) lasted 11 hours, ending in high forceps.
b) lasted 4½ hours, ending normally.
c) lasted 10 hours, ending normally.

39)* Para IV, age 25, white, full term; general physical condition good. Pains began coming irregularly at 3:30 P. M. Rectal examination at 9:40 P. M. showed the cervix thick, two fingers dilated, the head in high mid-pelvis, pains weak, coming every 10-15 minutes. Patient given 0.5 cc. thymophysin at 9:45 P. M. Pains did not begin until 10:00 P. M., but then they came very hard, lasting 50-60 seconds, with an interval of one minute between pains. Patient delivered normally of a female at 10:24 P. M.
Previous labors had all been much harder and longer.

40)* Para V, age 36, white, full term; general physical condition good. Patient began to have pains at 3:00 A. M. Rectal examination at 4:00 A. M. showed the cervix thick, 2 fingers dilated, the head in high mid-pelvis, pains moderately strong, coming every 5 minutes. Rectal examination at 8:40 A. M. showed the cervix fully dilated, the head in mid-pelvis, but the pains had become very weak, irregular, and longer apart. The patient was making no progress. She was given 0.5 cc. thymophysin. The pains at once became very strong, lasting 50-60 seconds, with intervals of 1-2 minutes between pains. Patient delivered normally of a female at 9:00 A. M.
Previous labor had lasted 8 hours and ended in a normal delivery. (From hospital record.) The first three labors, according to the patient, were all longer than 8 hours.

41) Para VI, age 33, white, full term; general physical condition good. Pains began at 3:00 P. M. Rectal examination at 4:30 P. M. showed the cervix thick, 2 fingers dilated, the head in high mid-pelvis, membranes ruptured, pains weak, lasting 10-15 seconds, coming every 10-15 minutes. Given 0.5 cc. thymophysin at 4:45 P. M. Pains at once became very strong, lasting 50-60 seconds, with intervals of 1-2 minutes between pains and continued to be very powerful. Patient delivered normally of a male at 5:28 P. M.
Previous labors:
a) lasted 24 hours, ending normally.
b) lasted 14 hours, ending normally.
c) lasted 14 hours, ending normally.
d) lasted 5 hours, ending normally.
e) lasted 18½ hours, 7 months pregnancy, ended normally; baby had spina bifida, and was an anencephalus.

42)* Para VI, age 27, white, full term; general physical condition good. Pains began at 6:00 A. M. Rectal examination at 11:20 A. M. showed the cervix thick, one finger dilated, the head in mid-pelvis, pains weak, coming every 5-10 minutes. Patient given 0.5 cc. thymophysin at 11:30 A. M. Pains at once became very strong, lasting 45-70 seconds, with an interval of one minute between pains. The head came down to the perineum at 11:45 A. M. Patient delivered normally of a male at 11:50 A. M.
Previous labors had all been rather long, lasting "all day".

43)* Para X, age 30, colored, full term; general physical condition good. Pains began at 3:00 A. M. Rectal examination at 4:15 A. M. showed the cervix thick, 1-2 fingers dilated, the head at brim, pains weak, coming every 10-15 minutes. Patient given 0.5 cc. thymophysin at 4:30 A. M. Pains at once became strong, lasting 30-40 seconds, with intervals of 0.5-1 minute between pains. Labor was very hard, the pains continuing to be very strong right up to the normal delivery of a male at 6:16 A. M.
Previous labors had all been more than five hours.

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THE NUMBER OF PHYSICIANS CONSULTED BY TUBERCULOUS PATIENTS AND THE REASONS FOR CHANGING FROM ONE TO ANOTHER

BY LINSLY R. WILLIAMS, M.D.,* AND ALICE M. HILL, A.B.*

IT has been widely accepted as a fact that the tuberculous person flits from physician to physician, does not wish to know what ails him, and, as a rule, is inclined to be dissatisfied with any treatment given. But according to the histories of 1499 patients, obtained by the National Tuberculosis Association in connection with a study of what tuberculous patients experience prior to their admission to a sanatorium[1], the patient who so conducts himself is unusual.

Possibly the patient who remains at home differs from his fellow who enters a sanatorium, but that the difference is considerable appears doubtful. The history of the sanatorium patient indicates that in his moves with respect to the medical profession he ordinarily was exhibiting merely a quite legitimate interest in his own welfare. That this is so is attested both by a comparison of the number of physicians consulted before the patient learned he had pulmonary tuberculosis with the number consulted between then and his entering the institution,

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and by the reasons for the patient's leaving one physician and going to another.

Approximately 47 per cent. of the patients reporting on this question (702 of 1480) had consulted only one physician before finding out that they were tuberculous. And after learning that they had tuberculosis, 63 per cent. (932 of the 1486 for whom this information was reported) accepted this diagnosis and consulted no other physician. That the search for the truth about the ailment is much more active before the first diagnosis of tuberculosis is obtained than afterwards is clearly shown in Table 1.

TABLE 1

THE NUMBER OF PHYSICIANS CONSULTED BEFORE AND AFTER THE PATIENT LEARNED THE DIAGNOSIS OF PULMONARY TUBERCULOSIS

Number of physicians consulted	Before diagnosis	After diagnosis
Total	1499	1499
None	—	932
One	702	400
Two	472	113
Three	210	24
Four	62	10
Five	22	4
Six or more	12	3
Unknown (including patient says never told was tuberculous)	19	13

More men than women consulted several physicians. This was probably due in part to the fact that the nature of the occupations of certain men caused them to change location frequently. The number of changes averaged 0.86 for each man and 0.67 for each woman before the patient ascertained the diagnosis of pulmonary tuberculosis and 0.57 and 0.48, respectively, afterwards.

Eleven hundred and fifty-six known changes of physician were made by 761 patients before the latter learned they had tuberculosis; and 789 changes were made by 560 patients after they were told the diagnosis but before they entered the sanatorium. (See Table 2.*) Of even more interest than the number of changes before and after the patient found out that he had tuberculosis are the reasons for these changes.

A change of location was responsible for 13.5 per cent. of the changes before and for 13.2 per cent. of the changes after the patient found that he was tuberculous. This embraces not only cases in which either the patient or the physician definitely moved the place of abode but certain others in which the physician was on vacation or in which the new physician lived so much nearer that by going to him the patient was saved a tiresome journey.

The attending physician was directly respon-

*The figures presented in Table 2 as to number of patients making changes differ slightly from those presented in Table 1 due to the fact that in a few instances it was known that certain changes were made though the actual number of physicians consulted was unknown; and also because in a few others a second physician was called into the case without there being any change from the first consultant.

TABLE 2

THE REASONS FOR THE CHANGES MADE BY PATIENTS BEFORE AND AFTER RECEIVING A DIAGNOSIS OF PULMONARY TUBERCULOSIS, BY SEX

Reason for change	Changes before diagnosis			Changes after diagnosis		
	Total	Males	Females	Total	Males	Females
Total	1156	659	497	789	435	354
Change of location by patient or physician; convenience	156	96	60	104	57	47
Physician not available for other reasons	11	6	5	5	—	5
To make application for admission to sanatorium	2	2	—	31	11	20
To consult specialist	—	—	—	17	10	7
Physician advised	222	139	83	217	127	90
Physician or hospital dismissed case	13	6	7	1	1	—
Change of symptoms seemed to call for new physician	11	7	4	1	—	1
To establish diagnosis	205	97	108	163	87	76
For more satisfactory treatment	189	117	72	62	28	34
To establish diagnosis and obtain more satisfactory treatment	70	29	41	5	2	3
Dissatisfied with physician for other specified reasons	10	4	6	9	5	4
Dissatisfied with physician, reason not specified	75	40	35	31	17	14
Patient wished to consult personal physician	16	8	8	16	8	8
Advice of relative, friend, or acquaintance	48	28	20	36	22	14
Advice of employer	39	22	17	12	10	2
Advice of nurse	4	4	—	5	4	1
Patient's lack of funds	7	6	1	12	10	2
Physician available or required	9	9	—	4	4	—
Emergency or chance	5	3	2	5	2	3
Long interval	28	16	12	13	7	6
Physician would not take pay	—	—	—	1	—	1
Unknown or not stated	36	20	16	39	23	16

sible for 222, or 19.2 per cent., of the changes made before the diagnosis and for 217, or 27.5 per cent., of those made after the diagnosis, by advising the patient to consult another physician. In the 222 instances the physician was activated almost exclusively by the feeling that another than himself could make a more authoritative diagnosis; in the 217, by the thought that a tuberculosis specialist was better fitted to advise the treatment necessary for the patient's recovery.

Closely allied to the changes due to direct reference are those to a clinic through which one sanatorium required applications to be filed, changes made by two patients before they obtained a diagnosis of tuberculosis and by thirty-one afterwards in order that they might enter the sanatorium.

Seven changes before and twelve after the diagnosis was made were stated to be due to the patient's lack of funds. One of these changes prior to the diagnosis was due to the patient's wish to obtain an x-ray free of charge, two of these subsequent to the diagnosis because the patient could not afford to follow the physician's advice. These figures are small, but they merit consideration when taken in connection with the answers to two other questions which appeared on the history form. One of these asked if a lack of funds had caused the patient to delay consulting the first physician; the other, if a lack of funds had caused the patient to consult any physician less frequently than advisable. A definite "yes" was recorded in answer to the first question for 76 patients in 13 sanatoria, private as well as public, and a doubtful "yes" for seven more. Thus about five per cent. of these 1499 patients postponed their first request for medical attention on account of their financial condition. To a somewhat greater extent were too infrequent consultations with a physician chargeable to a lack of funds, the answer to the second question being affirmative in 102 cases and doubtful in five others, or 7.1 per cent. of the whole group. A disproportionately large number of these patients who reported financial embarrassment were in the far advanced stage of tuberculosis when admitted to a sanatorium.

Considerably more changes were made for the purpose of establishing the diagnosis before the patient learned he was tuberculous than afterwards. And the reasons grouped under this one head, as expressed by the patients, indicated that different attitudes motivated them in the periods preceding and subsequent to diagnosis. Patients reported that before being told their ailment was tuberculosis, they changed physicians because displeased at receiving no diagnosis at all, or on being told that nothing was the matter, or because of dissatisfaction with the diagnosis received. One patient did not believe she had cancer; another whose mother and sister had died of tuberculosis doubted that the correct diagnosis in her case was pleurisy, neuritis and influenza; others who suspected they were tuberculous were unwilling to rest upon a diagnosis of low blood pressure or a heart affection. After being apprised that they were suffering from pulmonary tuberculosis, patients turned to another physician, frequently to one better trained, for the purpose of checking or verifying the diagnosis, to have an x-ray picture made, occasionally because the physician changed his diagnosis. And it is not surprising that a patient who has sought from a second physician confirmation of the first's diagnosis of tuberculosis should go on to a third when the second tells him he is only run down, not tuberculous, to a fourth when the third tells him he has merely a cold, and even to a fifth when the fourth tells him he is tuberculous.

Because the patient considered the treatment unsatisfactory, 189 changes were made previous to his learning that he had pulmonary tuberculosis, 62 subsequently. The dissatisfaction before the diagnosis arose from failure to improve under the physician's care; afterwards, it was an unwillingness to take the physician's advice or medicine.

In 70 instances before diagnosis, but in only five afterwards, the patient turned to another physician because, he said, of dissatisfaction with both diagnosis and treatment. A few of these patients and certain others expressed displeasure with the superficial character of the examination given them and the lack of attention. One thought the physician was not interested because he evaded questions. Another, though a diagnosis of tuberculosis was given him, considered the examination insufficiently thorough and believed the physician was exploiting him. Closely related to these were the 75 changes made before the patient was told that he was tuberculous and the 31 afterwards for such indefinitely expressed causes as that the patient had no confidence in the physician, that he wanted more information, or that he wanted the advice of another.

Motives associated with diagnosis or treatment, or dissatisfaction with the physician for other reasons, were responsible for more than twice as many moves previous to the diagnosis as subsequently, the numbers being respectively 549 and 270. Another 91 changes before the patient learned he was tuberculous and 53 afterwards were probably due to such causes, though recorded as resulting from the advice of a relative, friend, acquaintance, employer, or nurse. That such reasons motivated patients before they ascertained they were tuberculous in so many more instances than afterwards arouses the strong suspicion that much of the censure for the patient's failure to remain with one physician has been improperly directed. The data indicate that patients are much less disturbed when they learn they have tuberculosis than they are when in doubt, and that without a

definite diagnosis of which they are convinced, they will seek another physician in whose examination, diagnosis, and treatment they have confidence.

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HYDROCHLORIC ACID AND DIARRHOEA*

BY EDWARD S. EMERY, JR., M.D.†

IT is customary to think that an absence of hydrochloric acid in the gastric juice is a cause of diarrhoea, and to administer hydrochloric acid to those patients with diarrhoea in which achlorhydria exists. Yet frequently the two conditions occur separately and the question arises as to how far it is justifiable to relate them. With this in mind, I have looked over the medical cases at the Peter Bent Brigham Hospital in which a diagnosis of achlorhydria or achylia gastrica was reported.

It is seen from the table that 47 cases were collected. This represents only those cases in which free hydrochloric acid was not found on one or more examinations, and in which no disease was discovered to explain its absence. It did not seem wise to include cases in which pernicious anaemia was suspected, as the symptoms might be a result of that disease and I was interested in the possible relationship of acid to diarrhoea. Cases of sprue and carcinoma of the stomach were excluded for the same reason. The small number of cases is partly due to the fact that some were undoubtedly not diagnosed as such at the time of discharge. Any error that might creep in for this reason will be in favor of a relationship of achlorhydria to diarrhoea, as a lack of acid would be more likely to be noted in cases with diarrhoea than in those without it. Whenever the past history suggested that the bowels tended to be loose, the case has been included as one of diarrhoea, even though it was not always clear that the patient had actually any more tendency to diarrhoea than many supposedly normal persons might have. The figures represent, therefore, the greatest possible relationship between an achlorhydria and diarrhoea in this group.

It should be pointed out that the diagnosis of achylia gastrica is not strictly justified in many of the cases. The highest total acidity obtained in each case has been recorded. A glance at the table shows that the total acidity in many is too high for a true achylia gastrica in the absence of a considerable degree of retention, and there was no stasis demonstrated in any of these cases. However, it was thought best to retain these in the series for reasons to be considered later.

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Of the 47 cases in the series, 12 (nos. 1, 2, 5, 8, 12, 13, 18, 20, 26, 27, 34, 39) are reported to have had diarrhoea, or 25.5% of the total. This is a little higher than Sailer's observation that diarrhoea occurs in less than one-fourth of the cases of achylia gastrica[1]. On the other hand, we find that there were only 6 patients (nos. 7, 18, 20, 26, 27, 34) who entered the hospital because of diarrhoea. This amounts to only 12.7% of the total number of cases in the series. In the other 12.8% it was not possible to estimate from the records the importance of the diarrhoea from the patient's point of view, but one would get the impression that it played a minor rôle in most of the histories.

The obvious objection to these figures can be made that many of the cases were not proven to be true achylia gastrica. No entirely satisfactory check can be made on cases of this kind where the analyses have been done by different men, where there is no means of checking the technique used in passing the tube, or on the end point used in titration, and so on. Where a true achylia gastrica exists, one does not expect to find more than fifteen points of total acidity, allowing for possible over-running of the end point. Taking only the cases which had a total acidity of seventeen or under, there are 23 (nos. 2, 4, 5, 8, 9, 14, 16, 17, 19, 21, 22, 24, 27, 28, 29, 31, 32, 34, 35, 37, 39, 44, 45). Of this number, there were five cases (nos. 2, 5, 27, 34, 39) which had had diarrhoea at some time. Five out of 23 give a percentage of 25.5% previously found. Now, if one considers only those cases with diarrhoea as a complaint, there were only 2 in which the total acidity was 15 or less. This gives a much lower percentage, or approximately 8.7.

Such results suggest that there has been too great a tendency to stress the importance of the absence of acid as a cause of diarrhoea. Even if the larger (25.5%) of the two figures be taken, it means that only one out of four cases without acid has a diarrhoea. These results suggest that an absence of hydrochloric acid is not, in itself, a cause of diarrhoea. It is true that the incidence of diarrhoea in this series is higher than one would expect to find in a group of patients with some other condition, such as heart disease. On the other hand, it is not safe to draw deductions from this finding, for the fact that the gastro-intestinal tract is abnormal, as shown by

Case No.	Med. No.	Initials	Age	T. A.	Bowels	Complaint	Diagnosis
1.	6026	L. M. B.	31	20	Tendency to D.	Rheumatism	Gastric anacidity Mucous colitis
2.	6250	J. B. T.	50	14	Occ. D.	In for phys. check-up	Gastroptosis Chr. arthritis
3.	6376	H. M.	45	20	C.	General weakness	Renal tuberculosis and pulmonary tuberculosis
4.	6497	S. R. B.	19	16	C.	Stomach trouble	Neurosis achylia gastrica
5.	6502	T. J. J.	42	10	D. 1 mo.	Pain in the stomach	Cirrhosis liver Alcoholism
6.	6532	M. W.	50	40	R.	Stomach trouble	Chronic myocarditis Arteriosclerosis
7.	6542	B. A. T.	78	22	D. alt. with const. for 1 mo.	Indigestion and diarrhoea	Chr. myoc. Diarrhoea
8.	6590	M. E. R.	57	16	C.	Intestinal and bladder trouble	Gastroptosis
9.	6754	E. M. G.	46	12	R.	Soreness in stomach	Achylia Gastrica Chr. appen.
10.	6885	J. K. H.	58	50	C.	Indigestion	Achylia gastrica
11.	9123	D. S. M.	45	25	C.	In for physical exam.	Chr. constip. Achlorhydria
12.	9193	K. M. R.	58	34	D. at intervals	Stomach and bowel trouble	Achylia gastrica
13.	10429	M. E. B.	61	18	D. 7 mo.	Heart trouble	Herpes zoster
14.	11212	J. F.	48	17	C.	Noises in head and weakness	Achylia gastrica, no disease
15.	11791	C. M. H.	50	38	C.	Pain in the chest	No disease
16.	12619	A. L. B.	38	15	C.	Pain in abdomen	Visceroptosis, gastric neurosis
17.	13143	D. C. H.	61	6	C.	Gas and shortness of breath	Arteriosclerosis
18.	13403	S. F. C.	65	48	Always loose	Diarrhoea and weakness	Achylia gastrica Parotitis
19.	13463	M. L. C.	52	6	R.	Stomach trouble	Gastric neurosis
20.	13489	N. G. P.	57	27	D. 10 yrs.	Diarrhoea	Achylia gastrica Chronic myocarditis
21.	13538	J. B.	51	15	C.	Jaundice	Cholelithiasis, jaundice
22.	13985	M. B. G.	44	20	C.	Weakness, gas on stom.	Psychoneurosis
23.	14046	E. A. B.	49	40	R.	Anemia and gen. weakness	Sec. anemia Menorrhagia
24.	14510	J. M. L.	64	0	R.	Pain in the stomach	Achylia gastrica
25.	14758	L. B. N.	39	24	C.	Gas on the stomach	Gastric neurosis
26.	14942	M. L. S.	66	32	D. in fall	Loose bowel movements	Achylia gastrica
27.	14955	M. M. M.	24	14	D.	Gen. abdominal pain and loose bowel movement	Achylia gastrica
28.	15554	M. M.	51	12	R.	Neurosis	Psychoneurosis Menopause
29.	15604	A. H.	44	0	R.	Weakness	Sec. anemia
30.	15992	I. F. S.	71	34	C.	Weakness	Achylia gastrica
31.	17010	I. S. H.	54	8	C.	Pressure in epigastrium	Cholelithiasis Chronic constipation
32.	17982	H. A. H.	58	10	R.	Nausea and bitter taste	Arthritis
33.	18400	H. S. M.	46	24	C.	Gas in bowels	Const. intestinal indigestion
34.	18442	H. P. S.	26	13	D. 1½ yrs. vs. C.	Diarrhoea	Achylia gastrica
35.	18599	N. B. L.	61	10	C.	Pain in rt. side	Cholelithiasis
36.	18646	P. E. W.	61	34	C.	General pain	Arthritis Secondary anemia
37.	18988	J. M. L.	62	8	R.	Weakness and shortness of breath	Cardiac neurosis
38.	19115	G. H.	48	20	R.	Gas on the stomach	Cholelithiasis
39.	19724	E. S. W.	38	7	Occ. D.	Roaring in head	Psychoneurosis
40.	21840	M. M. M.	58	30	C.	Throat trouble	Hypertension
41.	24114	M. E. P.	38	19	C.	Pain in the epig.	Neurasthenia
42.	25704	S. M.	47	41	R.	Vomiting and exhaust.	Psychoneurosis
43.	25725	A. C.	76	NSA	R.	Difficulty in walking	Arteriosclerosis
44.	26059	J. F. M.	64	17	R.	Bilious attacks and dizziness	Arteriosclerosis Arthritis
45.	26517	E. M. L.	35	10	C.	Gas	Pyorrhoea
46.	26965	L. S.	66	22	R.	Gas in the stomach	Arteriosclerosis
47.	26979	J. T. B.	40	NSA	R.	Pain in the stomach	Cholelithiasis

Under the column headed "Bowels", R. means regular, D.—diarrhoea, C.—constipation.

the diarrhoea, may explain the achlorhydria rather than be the result of it.

Moreover, the knowledge we have about achylia gastrica does not support the view that it leads to diarrhoea. Schmidt and Strassburger[2] showed, many years ago, that the only evidence of a failure of gastric digestion is an inability to digest raw connective tissue, and cooked connective tissue is digested adequately, as shown by a study of the stools. It may be possible that the absence of the antibactericidal action of hydrochloric allows the development of a new flora which causes diarrhoea. That a different flora is present in the absence of hydrochloric acid has been shown[3], but that a harmful or disturbing flora can develop is yet to be proved. On the other hand, the development of a harmful flora is a question of chance and may explain why a diarrhoea develops in only a small percentage of cases.

It is now recognized that an achylia gastrica may be present years before evidences of pernicious anaemia become manifest. Although intestinal disturbances are common in pernicious anaemia, they are a very variable symptom. Intestinal disturbances vary in these patients just as the degree of nervous symptoms may vary. Not infrequently one sees patients with a quite marked blood picture who have had no diarrhoea, yet it is safe to assume that these persons have had a true achylia for many years. From the above facts it seems fair to deduce that an absence of hydrochloric acid should not, and apparently does not, necessarily produce a diarrhoea.

Another means of approaching the problem is to study the result of prescribing hydrochloric acid. Many physicians feel that they obtain satisfactory results by this means. I have occasionally seen a patient who seemed to have definitely improved on taking hydrochloric acid. In general, however, the results of this treatment have been disappointing in my experience, and I have not talked with anyone who has had uniformly successful results from acid therapy. The fact that for every patient who is helped, there are others who are not, takes it out of the category of a specific therapeutic agent. This suggests that the hydrochloric acid is inconsequential and that there is some other factor of which we are ignorant, but which, in conjunction with hydrochloric acid, may play a rôle in the question of the presence or absence of diarrhoea.

In conclusion, all the evidence at hand suggests that absence of hydrochloric acid is not a cause of diarrhoea. It seems more logical to suppose that, if there is no free hydrochloric acid in the gastric contents in patients with diarrhoea, one of the following situations may be present. The irritation of the lower intestines resulting in a diarrhoea inhibits the secretion of hydrochloric acid. It is a common clinical observation that irritation low in the tract will produce nausea. When nausea occurs, a gastric secretion is known to be inhibited. In the cases of pernicious anaemia, sprue, etc., it seems much more likely that changes take place in the gastro-intestinal tract which result in an achylia gastrica and diarrhoea than that the diarrhoea is the result of the achylia gastrica. Little is known about the secretions formed by the intestinal tract except that they produce enzymes which influence digestion. Investigators have carefully studied the bile and pancreatic juices and recognize that the intestinal juices are important adjuncts in digestion, but little is known of the value of the biliary and pancreatic secretions in the presence of an unhealthy mucous membrane. An absence of hydrochloric acid has been considered evidence of disturbed gastric mucosa. This disturbance may conceivably extend to the intestinal mucosa. In the same way, many cases of intractable diarrhoea may be due to temporary or permanent changes in the gastro-intestinal tract, resulting in both a loss of hydrochloric acid and a diarrhoea. There is little to warrant the belief that the absence of hydrochloric acid is a cause of diarrhoea.

SUMMARY AND CONCLUSIONS

From the medical records of the Peter Bent Brigham Hospital forty-seven cases have been collected which failed to show free hydrochloric acid on one or more gastric analyses. Ruling out those cases in which a true achylia gastrica probably did not exist, the incidence of diarrhoea in this series is too small to justify the idea that an absence of hydrochloric acid is a cause of diarrhoea. This is in accord with our knowledge of intestinal disturbance in pernicious anaemia and with a study of the stools. It seems more probable that the achlorhydria and diarrhoea are both symptoms of the same condition.

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2 Schmidt and Strassburger: Die Faeces des Menschen. August Hirschwald, Berlin, 1903.
3 H. L. Bockus and J. Band: The value of histamine as a test for gastric function. Arch. Int. Med. 39:508, 1927.

THE OPERATIVE TREATMENT OF TUBERCULOUS ARTHRITIS

BY CHARLES F. PAINTER, M.D.*

TO introduce, in these days, a warning on the side of conservatism in respect to the operative treatment of osseous and joint tuberculosis is, I am well aware, to bring down upon one's head a storm of criticism or a cynical contempt which is too complacent to be expressed except by indifference. Under the guise of diagnostic uncertainty, without biopsy many a joint is now treated by open operative methods which would have, on the law of chances, made

*Painter—For record and address of author see "This Week's Issue", page 795.

a spontaneous recovery. Many and many a case of pulmonary tuberculosis goes through its course to permanent healing without a diagnosis ever having been made, and presumably many more, due to the earlier recognition of symptoms through the active campaigns of public education in respect to this disease, are cured in a short time by following a proper hygienic régime. Those who have been connected with large orthopaedic clinics have all had the experience of seeing the Chiefs of Clinic make diagnoses of tuberculous joint lesions, order apparatus and find that before the braces were even finished, sometimes, the joint had passed on to recovery.

Diagnostic skill is no keener in these days and probably just as many cases of the sort described above are presenting themselves now as ever. If, instead of having a brace ordered, these patients are to be hurried to the operating table to be arthrodesed, it is quite likely that more than a few joints are destined to be spoiled by this method,—more, even, than in the days when mechanical therapy was the method of choice. At that time the patient had a chance not possessed in this hustling era and a visit to some of the larger clinics in our cities will astound one at the numbers of early operations that are now being done on tuberculous joints in children, nay even on some in the infant class. One of the great arguments put forth in justification is that something must be done to prevent the hospitalization of so many tuberculous joint lesions over such long periods of time and at such heavy expense to municipalities. Even the fact that the diagnosis is settled by biopsy is not a justification, for if the nature of the trouble is so questionable as to demand that method of study, it is probable that the early introduction of the right sort of conservative management would result in an early and safely rapid cure. It may well be that what is applicable and possibly defensible in the slums of a large metropolitan center is not necessary or proper in a better environment. The danger lies in the extension of these methods to classes of patients who do not need them and entrusting them to hands not qualified to employ them. For the vast majority of tuberculous joints in the young, the old and well established principles of treatment are just as sound today as they ever were and when operation is to be resorted to, it must be because conservatism has failed and the case has gotten out of hand pathologically for, in childhood at least, there is no justification for basing treatment upon any other grounds.

As in pulmonary tuberculosis, so here, early diagnosis is the most important factor in determining the nature of the treatment to be advocated. Encapsulation and, if possible, annihilation of the bacilli are the primary considerations in treatment, and all the surgeon can do is to favor these ends. Next comes preservation of as much serviceable motion as is possible, and lastly, avoidance of crippling deformity. At some joints a certain amount of deformity is essential if ankylosis is to occur. Before growth has ceased, it should be the surgeon's effort to procure a result along those lines. In adult life conditions have changed and for most cases an ankylosed joint ensures the best results. Time, in this period of life, has acquired an importance which it did not possess in childhood and youth. The goal to strive for in adult life is ankylosis for there is very little likelihood of procuring or preserving motion in a tuberculous joint in any locality except possibly the spine. Therefore in adults operative procedures having for their object extirpation of disease and fusion of the affected joint are the methods of choice. In the elbow, where it is possible completely to remove the disease without destroying the mechanism controlling movements of the forearm, a pathological cure is possible with preservation of controlled motion. At times this is feasible at the hip and the shoulder, but to a far less satisfactory degree; at the ankle and knee it is practically never possible; and at the carpus and tarsus especially favorable conditions must obtain which may make partial resection advisable, but if any considerable part of either tarsus or carpus has become involved, an amputation is generally the better procedure.

DR. DUGDALE HAS BROUGHT SUIT AGAINST THE *LOWELL SUN*

Dr. Frederick Dugdale, who formerly practiced in Boston, lost his registration in 1929 after a hearing before the Massachusetts Board of Registration in Medicine. He appealed to the Supreme Court for review of the action of the Board of Registration, but the Court did not give him relief.

The *Boston Herald* in its issue of October 9, 1930, stated in substance that the action of the Board was taken on "charges growing out of the death of Mrs. Mary Caton" of New Bedford following the use of the Koch treatment.

This treatment has been advocated and used by Dr. Koch of Detroit but has not met the approval of the American Medical Association.

According to reports from Lowell, Dr. Dugdale is suing the *Lowell Sun*. Such action is usually based on alleged libelous statements. Since the matter is before the court any expression of opinion is not in order.

In his testimony before the court Dr. Dugdale is reported to have affirmed his belief in the efficacy of the Koch treatment.

There are several specialists in cancer in attendance at the Court who may be called upon to testify for the defense.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 16421

SERUM TREATMENT IN TYPE II PNEUMONIA

MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. CHARLES L. SHORT*: This patient was a thirty-four year old Irish longshoreman. He was brought into the Emergency Ward on July 12.

The past history is essentially negative. He was a veteran of the British army, fought in the World War and received a wound in the left chest. This involved the lung, but healed up completely. He denied the use of alcohol.

The present illness started two weeks before admission. It consisted in a slightly productive cough, worse in the mornings. The sputum contained no blood. There was no pain. The patient continued working and thought nothing of it. Four days before admission he began to have pain in the left axilla and epigastrium, definitely brought on by coughing or deep respiration. He noticed no fever or sweating, had no chill, but had some loss of appetite. He remained at his work. His cough continued as before. The morning of admission he went to work at seven o'clock. He felt dizzy on the way and had visual disturbances so that he had to sit down several times. The pain in his chest and epigastrium became worse. He vomited a small amount. When he arrived at work he felt so weak that he had to lie down on the ground. He was found an hour later and brought to the Emergency Ward. He had no other symptoms in the present illness except frequency and dysuria for three days.

Physical examination showed a well developed and nourished man with rapid shallow respiration, complaining of pain in the left chest and epigastrium. He was lying flat and occasionally coughing and raising tenacious frankly bloody sputum. Temperature 102.4° by rectum, pulse 100, respirations 40. There was slight tenderness and spasm in the left upper quadrant. The lungs showed dullness to flatness at the left base from the midscapular region down, with frank bronchial breathing and markedly increased whispered and spoken voice of nasal quality. Tactile fremitus was present, not increased. On cough there were showers of consonating râles. There was tenderness to percussion in the left lower axillary region, with diminished bronchial breathing and spoken voice, nasal in quality, but no friction rub. The leukocyte count was 13,000. There was a slight trace of albumin in the urine, with 10 to 15 leukocytes.

The patient was admitted to the ward with a diagnosis of lobar pneumonia. At that time he did not seem very toxic. An x-ray taken on the way to the ward showed an area of mottled dullness extending down from the left hilus along the heart border. He was put on a régime of nourishing fluids with a chest swathe and pyramidon and codein as necessary. The following morning the temperature had fallen sharply to 97° by rectum, the pulse to 80, the respirations to 24. He seemed better on the whole, with less pain, though he felt weak and the blood pressure was low. He had slight distention, relieved by an enema. The physical examination was unchanged. The leukocyte count was 16,000, with 89 per cent polynuclears. The sputum was loaded with Gram-positive encapsulated cocci in pairs and chains. A mouse test showed the organism to be type II pneumococcus. A blood culture that day was reported to be positive for type II pneumococcus.

The following day, the sixth day of the disease, the temperature and respirations were still down. The pulse had risen to 100. The patient felt better. There were more râles at the left base and a definite pleural friction in the axilla. The leukocyte count was 15,000. The sputum that day was reported to be type I pneumococcus. That evening he had a sharp rise of temperature to 101.5° with no increase in pulse or respirations. The next day, however, the temperature dropped to 99° and he seemed better. He was quite clear and coöperative, although the day before he had been slightly irrational. There were fine râles with a rub present over the right middle lobe. The leukocyte count was 18,000. A blood culture was again positive for pneumococci, but it was not typed. The temperature remained normal the following day. The patient felt somewhat weaker, but not definitely worse. There was no pain or cyanosis. The signs were the same over the right middle lobe. The leukocyte count was 18,000. The sputum again showed pneumococcus type II. An x-ray that day showed the lower two-thirds of the left lung field dull and a grape-fruit sized area of dullness in the right lung field. That evening there was definite cyanosis present for the first time. The respirations were 30, the pulse 112, the temperature 99.6°. There was a patch of consolidation present below the angle of the right scapula. He seemed seriously ill and was kept under oxygen. During the night his respirations came down to 25 and the pulse to 110. His color had improved, apparently because of the oxygen. When taken out of the tent for a brief period the next morning, he became cyanotic and was put back until his death.

*Resident on the West Medical Service.

The ninth day of the disease the physical signs showed definite involvement of the right middle and lower lobes and the left lower and part of the left upper lobes. The patient became unresponsive and refused fluids. The leukocyte count rose to 28,000. He failed gradually throughout the day and by evening was in extremis. His temperature rose to 106°, his pulse to 160, the respirations to 50 just before his death.

CLINICAL DIAGNOSIS

Lobar pneumonia, type II, bilateral.

ANATOMIC DIAGNOSIS

Lobar pneumonia.

Pathologic Discussion

Dr. Tracy B. Mallory: This case of course offers no question as to diagnosis. The autopsy findings were exactly what one would expect. There was a very extensive lobar pneumonia with old gray hepatization in the left lower lobe, a patch of gray hepatization in the region of the right middle lobe, then fresh red areas in the right lower and the lower halves of both upper lobes. The only parts of his lungs that were free from pneumonia were very small portions of the two apices. In these cases it often seems quite extraordinary that they can last long enough for such an extensive amount of lung to become involved.

The only interesting thing from the purely pathologic side is that there is a great deal of recent argument as to whether the lung in lobar pneumonia is larger or smaller than normal. Part of this disagreement is just a question of difference of terminology. The pneumonic lobe is always larger than a fully collapsed lobe, and it is certainly occasionally larger than the normally expanded one. Between those two limitations there is possible marked variation. In this case the left lower lobe is much enlarged, quite as large as a fully expanded normal lobe. I believe the usual finding is that the affected lung is smaller than a fully expanded normal lung and again distinctly larger than a completely collapsed lung. It is impossible to draw a hard and fast line.

Dr. Frederick T. Lord: We shall have to abandon our former belief that in the stage of red hepatization the involved part of the lung is larger than normal.

I may say with respect to that that a fair proportion of involved areas in connection with lobar pneumonia show a varying and usually slight diminution in size by x-ray examination, as indicated by displacement of the heart and mediastinum toward the affected region, elevation of the corresponding leaflet of the diaphragm, narrowing of the intercostal spaces and increased downward inclination of the ribs on the involved side. The cause of the diminution in size is uncertain. It may be due to plugging of the bronchus leading to the collapsed area in the early stages of the disease. During the course, however, the physical signs with lobar pneumonia usually indicate, as in this case with bronchial breathing, increased voice and whisper, egophony and the presence of tactile fremitus, that the bronchus is open. We have come to place much reliance on such signs as an assurance that the bronchus is patent.

Dr. Mallory: I think that is evident also histologically. In the more recently involved portions the involved alveoli are filled with exudate, their neighbors still distended with air. That does not indicate that the process started with collapse.

How do you feel about the question of serum treatment in this case?

Dr. Lord: The problem presented by this patient seems somewhat complicated. He entered the hospital four days after an onset with pain in the side, but the evolution and grouping of the initial symptoms was atypical for a pneumonia due to type I or type II. An explosive onset with such other symptoms with the pain and cough as chill, rapid elevation of temperature and rusty sputum is ordinarily to be expected in these two types of pneumococcus infection. Unfortunately, however, not all patients with these types have typical onsets and a deduction regarding the type of infection from the initial manifestations is subject to considerable chance of error in any individual case.

Serum therapy is of value in both types I and II infection. It is much more effective within the first three days of the illness than later in the course and it thus seems desirable to save time and give serum in hospital cases before the type is determined when there is good reason to suspect that we may be dealing with type I or type II infections. In making a decision whether or not to give serum before the determination of type the typical or atypical character of the onset alone should have relatively little weight. The circumstances under which the disturbance arises are of greater importance. Postoperative pneumonia, pneumonia arising as a complication in the course of circulatory disturbances and pneumonia in elderly persons is usually atypical in onset and seldom due to type I or type II pneumococcus and it seems best to exclude such cases from the routine use of serum before the determination of type.

Dr. Mallory: Goodner's* experiments on rabbits are a perfect experimental demonstration of what Dr. Lord has just said about serum treatment late in the disease. Goodner produced in the skin of rabbits with type I pneumococcus an intracutaneous infection which ran a limited course, seven days on an average. He had one advantage over men who make clinical studies of pneumonia. He was able actually to see the lesion in all stages. Both the local

*Goodner, Kenneth: Jour. Exper. Med. 1928, 48:413.

and the generalized symptoms terminated suddenly, as if by crisis, showing a close analogy to clinical pneumonia in man. Animals treated with serum just after they had been infected needed only a small dose to protect them, after twenty-four hours twice as much and after seventy-two hours three times as much. Assuming that proportionate amounts would be needed to treat human beings, he figures that at 24 hours 150 cubic centimeters of average unconcentrated serum would be needed to effect a cure, at 98 hours 325 cubic centimeters, at 72 hours 475 cubic centimeters. On the fourth or fifth day one or more liters would probably be needed. It is quite possible that these findings explain the frequent poor results with type I serum. The number of cases effectively treated with serum in less than three days is pretty small.

CASE 16422

EVALUATION OF ABDOMINAL PAIN IN CHILDHOOD

SURGICAL AND CHILDREN'S MEDICAL DEPARTMENTS

A female Italian child of six was admitted to the hospital on August 8. The history, obtained from her mother, was as follows:

August 5, three days before admission, the child was put to bed with a fever. The following morning she awoke complaining of abdominal pain. The pain and fever persisted throughout the day. The child remained in bed, eating very little but drinking freely. Urination was frequent. At times she spoke of pain and burning during passage. The abdominal pain was not severe, but there was some soreness on pressure. That evening she complained of soreness in the throat and an ache in her right ear. She was given a cathartic (Ex-Lax), producing one movement during the night and two the following morning, August 7. That morning the pain was still present in the abdomen and the right ear, and she vomited once. She still had fever, how high we do not know. Her doctor then advised removal to a hospital, making a diagnosis of probable appendicitis.

The past history was entirely negative except for mumps followed by measles three months before admission. She had not been subject to sore throats, and had had no previous attacks of abdominal discomfort similar to the present one.

The family history was negative except that the father had frequent colds and nosebleeds in winter.

Physical examination. The child was well developed and nourished, and though she seemed ill she did not appear to be in much pain. Her legs were held in flexion most of the time, but could be straightened without discomfort. The tongue was thickly coated and the teeth were dirty. The tonsils were greatly enlarged, red, and some exudate was visible. Her right ear drum was dull red and bulged slightly. The left was a little red and did not bulge. Glands in both tonsillar regions were somewhat enlarged and tender. The abdomen was held rather tense but could be relaxed under steady and careful pressure. No masses could be felt. The child complained of pain on abdominal pressure at times, but quite as much on pressure over the chest and on the extremities.

The temperature was 102.6°, the pulse 142, the respiratory rate 25.

Laboratory findings. The urine (not a catheter specimen) showed a slight trace of albumin, 20 to 25 leukocytes per high power field and occasional hyaline casts. A catheterized specimen showed 2 to 5 leukocytes per high power field and occasional casts. A leukocyte count was 33,400.

Clinical course. It was decided to watch the child carefully overnight. The following morning the right ear drum was opened and pus obtained. The left showed no further evidence of infection. The temperature reached 104°, the pulse 142, and the respirations 28 on that day. There seemed to be no change in the abdominal picture. On the second day after admission the child appeared sicker. That evening her temperature reached 105.6°, the pulse 156 and the respirations 48. The chest was negative, the left ear negative, the right draining well. The leukocyte count had dropped to 18,140, polymorphonuclears 95 per cent. A surgical consultation was requested.

DISCUSSION

BY E. PARKER HAYDEN, M.D., AND JOHN DUNPHY, M.D.

DR. HAYDEN: I saw this patient in consultation the evening of the second day. The child was restless, cried when touched, and it was difficult to make an abdominal examination satisfactorily. My first impression was definitely that the child had an acute intra-abdominal condition, probably appendicitis with spreading peritonitis. But as she quieted down and lapsed into a light sleep the abdomen relaxed and it was possible to press the fingers quite deep into the abdominal wall. I then concluded that with tonsillitis, middle ear infection and some pyelitis definitely established, it was justifiable to observe the child for another twenty-four hours and carry on as at the present.

The following morning the temperature dropped to 100°, the pulse to 120 and the respirations to 35. The leukocyte count dropped to 15,100. Our conservative policy seemed certainly to have been justified. But at seven p. m. the temperature had risen to 104.6°, the pulse to 150, while the respirations were 40. I then examined the child again. The abdomen was

board-like in generalized spasm. Operation was immediately decided upon.

DR. DUNPHY: This patient was seen by me about noon on the day of operation, primarily because of abdominal pain which had been present and still persisted. She appeared quite ill, though not alarmingly so, and resisted being moved or examined, preferring to lie on her right side with marked flexion of the legs.

Examination revealed a discharging right ear with no drooping of the canal wall and no mastoid tenderness. The tonsils were enlarged and injected, and the exudate previously present had disappeared. The lungs, etc., were negative. The abdomen was slightly distended, and the patient seemed to experience discomfort when palpation was attempted. There was spasm in the lower abdominal muscles, considerably more marked over the right rectus, while above careful palpation revealed the muscles much more relaxed.

At this time the patient had begun to show definite signs of an intra-abdominal inflammatory process, probably appendicitis with beginning peritonitis. Because of these findings operation was advised.

It is interesting to note that in a few hours the abdomen was board-like, in generalized spasm. It is apparent that this patient for several hours preceding operation presented abdominal signs considerably different from those on entrance. The pain had been present since the onset of the illness, the muscle spasm, distention and marked discomfort on abdominal palpation appearing later. Paracentesis with favorable drainage would be expected without further complications to lower the temperature and improve the patient's condition. Yet she became sicker, the temperature rose to 105.6°, the pulse to 156, and the leukocytes decreased almost 50 per cent.

PREOPERATIVE DIAGNOSIS

General peritonitis, etiology undetermined.

OPERATION

Under ether anesthesia the abdomen was opened with a right lateral rectus incision. Free pus was encountered. It was rather thin, flaky and odorless. A culture was taken. The appendix was located, lying matted down between the cecum and a neighboring adherent coil of small intestine. It was obviously not the cause of the peritonitis, but was quickly removed, the pus aspirated as completely as possible, a drain inserted to the pelvis, and the abdomen closed. The operation consumed nineteen minutes. The child stood it well.

PATHOLOGIC REPORT

Acute and chronic peri-appendicitis.

BACTERIOLOGIC REPORT

Culture showed pneumococcus type I.

POSTOPERATIVE COURSE

For the next three days the child ran a temperature of 102° to 103°, a pulse of 130 to 150 and respirations about 35. Type I antipneumococcus serum was given in four doses of 12, 20, 30, and 20 cubic centimeters during the fourth and fifth days after operation. The child became steadily worse and died on the sixth day after operation, the tenth day after admission.

FURTHER DISCUSSION

DR. DUNPHY: It appears then that this patient probably developed peritonitis toward the end of the second or during the third day. As her resistance to the virulent pneumococcus organism diminished her leukocytes again decreased, reaching 15,100 just before operation. The early and persistent abdominal pain might be explained by enlargement of the abdominal lymph nodes, believed by many to be responsible for the abdominal pain so frequently complained of by children with infections in the throat and elsewhere.

This case well illustrates the care which must be exercised in investigating the abdominal complaints of children. Abdominal pain is one of the most common reasons for which the mother consults the physician. It accompanies almost every disease involving the gastro-intestinal tract and the abdominal organs, from the functional derangement in constipation to appendicitis, intussusception, etc. We are all familiar with the children who have tonsillitis, pyelitis, or pneumonia, and who say that the abdomen hurts when asked where they are sick. Each case then calls for a thorough and detailed examination of the body in general, including the abdomen. It cannot be emphasized too strongly that considerable time and patience are necessary in many cases to obtain the coöperation of the infant or child without which the examination becomes unsatisfactory. Diverting the attention by one of the many methods is extremely important and allows interpretation of the various physical findings. In this way the abdominal pain of pyelitis, constipation, diarrhea, tonsillitis, pneumonia, etc., is seen to be free from the involuntary muscle spasm and other findings present with appendicitis, peritonitis and intestinal obstruction. Of course in pneumonia the increase in respiratory rate is usually out of all proportion to the increase in pulse rate. The appearance of the patient, the presence of early lung findings at the base or high in the axilla, the x-ray and so forth, all point to lung rather than abdominal involvement.

Pneumococcus peritonitis may appear as a primary disease with no focus evident or it may be preceded by pulmonary symptoms, tonsillitis or infection of the middle ear. Whether the infection of the peritoneum in primary peritonitis occurs by way of the blood stream or the lymphatics, the gastro-intestinal tract or the vagina

is difficult to state, though it has marked preference in the female, and the presence of the pneumococcus in the vagina points strongly to the vaginal route. In this case the peritoneal infection appears to have been derived from the nasopharynx or the ears.

Because of the success obtained in treating type I pneumonias with pneumococcus serum, it seems advisable in cases of pneumococcus peritonitis showing this organism to use the serum as early as possible, whether the diagnosis is made clinically, by peritoneal aspiration or by laparotomy.

DR. HAYDEN: This case presents several interesting points for discussion, both in diagnosis and in treatment. Pneumococcus peritonitis, though not common, occurs with reasonable frequency, and as has been stated, is almost entirely limited to female children. It is commonly preceded by an upper respiratory infection, not necessarily a severe one, and is characterized usually by sudden onset with high fever, diarrhea and persistent vomiting. Abdominal rigidity is a fairly constant early symptom. This case was atypical, and it is difficult to say just when the peritonitis developed, whether it was present on admission or whether it developed on the third day, following the drop in temperature, pulse, and leukocyte count which made us think the child was getting better. The leukocytosis of 33,400 on admission is a good average count in this disease. Marsch[1], in a review of 9000 cases of appendicitis, found only 1.1 per cent occurring in children from 1 to 5 years of age. It is not common as early as the sixth year, and yet we have all seen appendicitis occur in the very young. A differential diagnosis should be made if possible between a peritonitis originating from the appendix and a peritonitis of other origin. Pneumococcus can gain access to the peritoneum either through the blood stream, the gastro-intestinal tract, or the genital tract. Lipshutz and Lowenburg[2] in a series of thirteen cases found positive blood cultures in nine. Twelve of the thirteen were girls. In three of the girls pneumococcus was found on vaginal smear. The great preponderance of female cases of course suggests the genital tract as a likely portal of entry. The disease occurs chiefly among poorer children, who may be considered to receive less hygienic care of the genitalia. In this series of cases the greatest infection found at necropsy was in the region of the cecum and pelvis. For this reason Lipshutz and Lowenburg advocate very early drainage of the pelvis through incision in the cecal region. Of their cases 80 per cent were operated. The mortality was 100 per cent. Presumably they were *not* operated early enough. These authors quote other statistics of mortality as follows:

Koennecke	27	cases	Mortality	55	per cent
Rohr	88	"	"	13.7	" "
Jensen	90	"	"	64	" "
Fraser and McCarthy	?	"	"	42	" "

This wide divergence is hard to understand, and the methods of treatment are not stated.

Mathieu and Davioud[3] report twelve cases, all girls. Diarrhea occurred in each case, and sore throat preceded. They advise expectant treatment, and drainage late if at all.

Salzer[4] insists that one should be able to make an early differential diagnosis between appendicitis and pneumococcus peritonitis. He reports thirty-one cases, in twenty-one of which he made a correct early diagnosis. All of the twenty-one were treated conservatively and fifteen recovered. The pus becomes either absorbed or encapsulated, and in the latter case can be drained later in the course of the illness. Of eight cases operated early, six died. Salzer emphasizes the importance of a vaginal smear.

Fricke[5] reports a series of ten cases, eight children and two adults. Five children had signs suggestive of bronchopneumonia on admission. Seven were operated upon on the day of admission. Appendectomy was done in all cases. Pneumococcus was found in all. Only one child survived. Both adults survived, one on serum treatment without operation, the other with appendectomy and bilateral salpingectomy for acute pneumococcus salpingitis.

It can be seen from these several abstracts that the diagnosis of pneumococcus peritonitis is not always made early, and the treatment is not standardized. A vaginal smear should always be made. Peritoneal puncture with smear from needle tip has its advocates, who insist that it does no harm. To overlook acute appendicitis is a serious error. In any case where the diagnosis is in doubt, early operation is probably the wisest procedure. I feel certain that in male children it is very risky to delay operation unless the diagnosis of pneumococcus peritonitis has been established beyond a doubt by peritoneal puncture. Many would question the safety of making a puncture in the early hours of an infection when the presence of a free exudate in the peritoneal cavity is by no means a certainty. The relative infrequency of pneumococcus peritonitis makes the acquisition of a large series of cases a matter of years, and to draw fixed conclusions from small groups is dangerous.

DIAGNOSES

General peritonitis, acute pneumococcal.
Acute otitis media, right.

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THE TREATMENT OF TRAUMATIC EPILEPSY BY THE FOERSTER-PENFIELD METHOD OF RADICAL OPERATION

THE recent visit of Professor Otfrid Foerster, the distinguished neurosurgeon of Breslau, to the Peter Bent Brigham Hospital, calls to our attention again the unusual investigations made by him, in the last few years, on the subject of traumatic epilepsy. For many years he has been interested in the physiology of the central nervous system[1] and has paid special attention to the cortex as observed at the time of operation in patients under local anesthesia. He has carried out the mapping of the cortical areas by this method of human experimentation to a degree not exceeded by any other investigator. It is interesting to note, in passing, however, that the first observations on the human motor cortex were described, as noted by Fulton[2], by Dr. Harvey Cushing in 1909[3]. Foerster's investigations of the cortex by electrical stimulation have led to a definition of certain epileptogenic cortical areas which extend considerably beyond the so-called motor cortex. These excitable areas are to be found in front of, and also behind, the precentral convolution, as well as in the temporal and occipital lobes. The movement patterns, which follow the stimulation of such areas, provide a local sign which often makes it possible to define exactly the cortical focus of an epileptic discharge.

Foerster examined over 100 post-traumatic cases by this method in his Breslau clinic and came to the conclusion that possible removal of these cortical areas might relieve the symptoms of epilepsy. The importance of this work was greatly enhanced by the work of Wilder Penfield of Montreal[4], who, independently and in collaboration with Foerster[5], pointed out that the old cortical scars, responsible for the occurrence of traumatic epilepsy, contain connective tissue and fibrous astrocytes which rapidly form and become densely attached to the overlying meninges and are invaded by a rich plexus of newly formed blood vessels. The scar contracts steadily for a period of years and this contraction is responsible, in the opinion of Penfield, for the displacement of the cerebral ventricles towards the lesion, a condition easily demonstrated by encephalography.

These two findings have been put together with the suggestion that a cure in patients with traumatic epilepsy might be brought about by the total removal of the scar tissue along with the epileptogenic cortical area. It was felt at first that removal might lead to more scarring of the brain and the condition would be the same, in a few years, as that found before operation. Penfield has shown very definitely, however, that such is not the case, for careful surgical removal leaves a very small scar behind it, and in the latest report of these two writers a number of cases operated upon by this method have remained free from epileptic attacks from two to three years.

This method of treatment is obviously radical and should only be considered in selected cases. The good results reported by these workers, however, are worthy of careful consideration.

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3 Brain, 25:1, 1909.
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TWO MATTERS OF ESPECIAL INTEREST CONSIDERED AT THE MEETING OF THE COUNCIL OF THE MASSACHUSETTS MEDICAL SOCIETY

AT the meeting of the Council on Wednesday, October 1 it was voted, on the recommendation of the Committee on Membership and Finance that the annual dues to be assessed the members of the Society for the next year shall be ten dollars, this being an increase of two dollars. The ex-

planation was submitted that the budget has exceeded the income in some years and that the prospective activities of the Society warrant the change. To some this increase may seem to be a burden, but it was explained that most State Medical Societies have larger annual dues than those of the Massachusetts Society and it should be remembered that a considerable proportion of the amounts collected previous to March 1 of each year is rebated to the district societies. Another gratifying fact is that in some states the county societies have separate rather large annual dues in addition to those levied by the State Societies. In one state the assessment on members of a county in addition to State dues is fifty dollars.

Another matter of interest was the discussion on the report of the Committee on Clinics, Health Associations and Industrial Clinics which was held over from the last meeting. The consensus seemed to be that the report was good so far as it went but that there should have been presented more definite standards as guides for future activities of Clinics and Health Organizations. As a result of these criticisms the report was referred back to the committee for further study and more definite recommendations.

This brief reference to the proceedings of the Council should not be construed as intimating that other matters were not given due consideration.

All who are interested in the affairs of the Society should read the detailed report of the proceedings which will be prepared by the Secretary and published in an early issue of the *Journal*.

Large delegations from all sections of the State were present, and the business was conducted with dispatch.

INFANTILE PARALYSIS IN NEW ENGLAND

Scattered cases of infantile paralysis are being recognized throughout New England.

In Middlesex County in Connecticut eleven cases have been reported with six deaths. Although the disease is not as yet so prevalent as in some former years, it presents a very definite public health problem which calls for coöperation of physicians and public health officials.

If a physician is uncertain in his diagnosis of the acute illnesses of childhood or early adult life, he may save himself annoyance and his patient from danger if he will call a consultant early. The State Department of Public Health will furnish consultation service if there is any question of infantile paralysis.

In cases of infantile paralysis, waiting for all of the evidences of the disease to appear, may be disastrous. Suspicion in a doctor's mind of the possibility of the disease is reason enough for asking for a consultation.

THIS WEEK'S ISSUE

Contains articles by the following named authors:

Benner, Richard S. M.D. Harvard 1903. F.A.C.S. Surgeon, Springfield Hospital, Springfield. Secretary, Executive Committee, Wesson Maternity Hospital, Springfield. Consulting Obstetrician, Noble Hospital, Westfield, and Mary Lane Hospital, Ware. His subject is: "Fibromyomata of the Uterus Complicating Pregnancy." Page 757. Address: 104 Maple Street, Springfield, Mass.

Deaver, John B. Sc.D., M.D. University of Pennsylvania School of Medicine 1878. F.A.C.S. John Rhea Barton Professor of Surgery, University of Pennsylvania School of Medicine (now Emeritus of same). Surgeon-in-Chief, Lankenau Hospital, Philadelphia, Pa. Address: 1830 De Lancey Place, Philadelphia, Pennsylvania. Associated with him is:

Eckels, John C. A.B., M.D. Harvard 1927. Assistant Resident Surgeon in Urology, Peter Bent Brigham Hospital, Boston. Address: 721 Huntington Avenue, Boston. Their subject is: "The Value and Limitations of Spinal Anesthesia." Page 760.

Davis, Max. A.B., M.D. Harvard 1925. Assistant in Obstetrics and Gynecology, Boston University School of Medicine. Second Assistant Obstetrician, Massachusetts Memorial Hospitals. Gynecologist, Outpatient Department, Massachusetts Memorial Hospitals. His subject is: "The Use of Thymophysin in Labor." Page 771. Address: 311 Commonwealth Avenue, Boston, Mass.

Williams, Linsly R. A.B., A.M., M.D. Columbia 1899. Director of New York Academy of Medicine and President of New York Tuberculosis and Health Association. Address: 5th Avenue and 103rd Street, New York City. Associated with him is:

Hill, Alice M. A.B., Statistical Field Service, National Tuberculosis Association, New York City. Address: 370 Seventh Avenue, New York City. Their subject is: "The Number of Physicians Consulted by Tuberculous Patients and the Reasons for Changing From One to Another." Page 782.

Emery, Edward S., Jr. M.D. Harvard 1920. Associate in Medicine, Peter Bent Brigham Hospital. Assistant in Medicine, Courses for Graduates, Harvard Medical School. His subject is: "Hydrochloric Acid and Diarrhoea." Page 785. Address: 319 Longwood Avenue, Boston.

Painter, Charles F. A.B., M.D. Harvard 1894. His subject is: "The Operative Treatment of Tuberculous Arthritis." Page 787. Address: 520 Commonwealth Avenue, Boston.

MISCELLANY

PHYSICIANS REPORT ON NURSING SUPPLY

On a typical day in a period of heavy sickness load, only two per cent. of those patients who needed a special or private duty nurse were unable to get one, it was shown by the answers of 4,000 physicians to questionnaires on the demand for nurses in their own practice.

This case check-up by the physicians substantially agrees with the growing evidence from other sources, such as the registries, that there is at present no shortage in the general supply of nurses, and that it is, indeed, closely approaching the saturation point, as far as actual, economic demand is concerned. These studies of the nursing situation were made by the Committee on the Grading of Nursing Schools.

Informal comments from the doctors corroborated statistical findings that, while it is sometimes hard to get a nurse for Sundays, out-of-town cases, or twenty-four hour duty, it is almost never impossible to find any special nurses at all.

The physicians questioned represent those who minister to the most heavily nursed portions of the community, in cities and towns of all sizes. The months studied were January and March, two peak months of illness. It was found that, on the day of his answer, the typical physician had three patients who needed special nurses and two who got them. But of all the patients who, in the estimation of the attending doctor, needed a nurse, only two in each 100 were unable to find one.

Of the patients who did not have the special nurse recommended as necessary, it was found that:

45% could not afford a nurse
29% were cared for by relatives or friends
13% did not want a nurse
7% were cared for by a visiting nurse

Only 6% of these patients, or 2% of the total number, wanted a nurse but could not find one.

These findings are especially interesting from the standpoint of actual economic demand and willingness to pay for nursing service on the part of patients. More than 500 patients, for example, did not want a nurse and did not engage one, though, in the opinions of their physicians, they needed her skilled nursing care.

In the period of a month, the typical physicians in this group had five patients who employed nurses. They estimated that, given adequate floor service in the hospital, two of the five would not have needed "specials". Twenty-six per cent of the physicians felt that some of their patients could have been cared for by a visiting nurse or hourly service, and 27 per cent. felt the services of relatives or competent servants would have been adequate.

Since the physicians reporting were a selected group, caring for the most heavily nursed members of the community, it would seem, from the foregoing facts, that for the profession as a whole the daily average of patients per physician actually needing skilled nursing care is much less than three.

Half the physicians in this heavily nursed group declared that every one of their patients who needed private duty nurses had them. There is, therefore, reason to believe, the study states, that the lack of a nurse is often due not to a shortage, either in the general or local supply, but to the patient's decision that he did not want or could not afford a nurse.

Since, in the opinion of the doctors, two of every five patients employing special nurses could have been cared for by the floor service of a well-run hospital, the increase of adequacy of such floor service would mean a decrease in the employment of "specials" and additional employment of full-time graduates in the hospitals instead.

Many hospitals are already studying the problem of increasing the supply of graduate nurses on their staff so as to lessen the cost of nursing care for the patient and yet add little additional expense to the hospital's budget.

Seventy-three per cent., or almost three-fourths, of the physicians said they feel it is harder for their patients to pay the nurse's fee than to obtain her services. Those in the North Central and Western states were more emphatic on this point. Paying the fee is slightly less of a problem in the larger cities than in the smaller ones.

Of 23,500 physicians who answered questions as to the general need for private duty nurses in their practice, 87 per cent. of the general practitioners said they need them often; 5 per cent., occasionally; and 8 per cent., practically never.

The specialists, who make up two-fifths of the total number reporting, showed somewhat less demand for the special nurse, with 79 per cent. requiring them frequently for their cases and 17 per cent. practically never. The private duty nurse is most in demand by the surgeon and obstetrician, 98 and 94 per cent., respectively, saying they often need her for their patients. The percentage of need in the other specialties were:

Internal medicine, 89%
Orthopedic surgery, 86%
Pediatrics, 85%
Urology, 85%
Ophthalmology, 75%
Neurology, 57%
Tuberculosis, 47%
Industrial medicine, 47%
Dermatology, 33%
Roentgenology, 25%
Public health, 9%

Though physicians sometimes have to call two or three registries to get nurses for certain types of cases, their comments show much more frequently an inability to get the kind of nurse they feel is particularly needed for the case, rather than a total unavailability of nurses.

About two calls per physician were refused during a one-month period. The doctors find that nurses are most apt to turn down calls for twenty-four hour duty, night duty, cases in the home, Sunday or holiday cases, and those requiring the nurse to go out of town.

In fifty-two per cent. of cases, the source of supply for nurses was the hospital registries; 21 per cent. of the physicians got nurses through their own lists;

17 per cent., through the central registries; 5 per cent. from the commercial registries, and 5 per cent. from unspecified sources.

Not unnaturally, the physician finds the nurse he gets from his own private list the most satisfactory. Nine out of ten of all the physicians said they would like to have the nurse on their last case back again.—*Martha Dreiblatt, Committee on the Grading of Nurses, New York City.*

GOVERNMENT HOSPITALS IN NEED OF MEDICAL OFFICERS, NURSES, AND SOCIAL WORKERS

Washington, D. C., October 1930.—The United States Civil Service Commission states that Government hospitals throughout the country, including those under the Veterans' Bureau, the Public Health Service, the Indian Service, and other branches, are in need of medical officers and nurses of various grades, and that Veterans' Bureau hospitals have vacancies in positions of psychiatric social worker and junior social worker.

Full information regarding examinations, salaries, etc., may be obtained from the United States Civil Service Commission, Washington, D. C., or from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city.

COTTONSEED A PELLAGRA PREVENTIVE

Dr. W. W. Skinner of the U. S. Bureau of Chemistry is quoted by the *Boston Transcript* as claiming for cottonseed a cheap source of vitamin G and B, the former regarded as a preventive of pellagra and the latter of beriberi.

Studies bearing on this subject have been conducted jointly by the Department of Agriculture and the National Cottonseed Products Association.

THE AWARD OF THE OSLER MEMORIAL MEDAL

The Osler Memorial Medal for 1930 has been awarded to Sir Wilmot P. Herringham.

The Board, entrusted with the responsibility of this award, confers this bronze medal every five years to the person who is an Oxford Medical graduate and who in this group has, according to the estimate of this board, made the most valuable contribution to the science, art or literature of medicine.

SOME OF THE ACTIVITIES OF THE MILBANK MEMORIAL FUND

Details of an attempt to bring health to a county with 400,000 inhabitants but not a single qualified physician, are contained in the October issue of the *Quarterly Bulletin*, just published by the Milbank Memorial Fund.

"A Rural Health Experiment in China", describes some of the conditions found by a representative of the Fund in a district where the average person does not live longer than 35 years.

The article records the donation of $50,000 by the Milbank Memorial Fund to aid the health program now being undertaken in Ting Hsien. This announcement follows closely upon news from Geneva that the League of Nations has decided to support and coöperate in attempts to modernize China's health service despite that country's seeming preoccupation with civil war.

The Ting Hsien experiment is part of the Chinese National Association of the Mass Education Movement. This organization was formed in 1923 by Y. C. James Yen, a Yale graduate. "Jimmie" Yen, as he is more familiarly known, brought about large-scale mass education in China through reducing the number of written word characters in the language from 40,000 to about 1,000.

The health program was worked out on the ground, with the technical assistance of Edgar Sydenstricker, director of the Fund's research division.

TERCENTENARY HONORS FOR PIONEER HEALTH WORKERS

On Boylston Street opposite the Brookline Reservoir there have been placed two markers, one by the local Tercentenary Committee and the other by the State. Both markers indicate that the house on the adjacent property was built by Dr. Zabdiel Boylston, who introduced into this country the inoculation of smallpox.

In 1721 smallpox was very prevalent in Boston. It seemed as if none would escape the disease. About one in four or five of those who contracted the disease died and those who escaped death were usually much disfigured. Dr. Boylston who was practicing in Boston heard of the process of inoculation which was then being used in Turkey and Asia Minor. Lady Mary Wortley Montagu had her son inoculated in 1717 in Constantinople and was trying to introduce this practice in England.

Inoculation should be carefully distinguished from what we now call vaccination. It was performed by taking some of the infectious material from an active case of smallpox and introducing it into a well person. This produced the disease but in a much milder form, so that among the inoculated there was only about one death in one or two hundred, as compared with one death in four or five cases among those who contracted the disease in the usual way.

Dr. Boylston strongly advocated the practice and showed his faith in it by inoculating his own son and two of his servants or slaves. There was tremendous opposition. It was considered a crime, practically murder, to deliberately give anyone such a terrible disease. Dr. Boylston barely escaped by hiding from a mob that was trying to lynch him. Gradually, however, the feelings of the people cooled, and the value of inoculation was recognized. Many lives were saved by it. Dr. Boylston lived to be honored both in this country and abroad for his clear vision and courage. On retiring from practice, he built the house in Brookline which is now standing, although additions to it have since been built.

By the end of that century, we find the inoculation of smallpox being carried out very extensively by another distinguished Brookline physician, Dr. William Aspinwall. A marker on Aspinwall Avenue opposite St. Paul's Church indicates the site of his house.

Dr. Aspinwall served with distinction in the War of the Revolution, and then returned to the practice of medicine in Brookline. Following the war, and partly as a result of it, there was a great increase in smallpox, and the doctor began to protect his patients by inoculation. Instead of inoculating people in their homes, however, he had a hospital for his patients. This served the double purpose of giving them good medical and nursing care and also of isolating them from the community at large; for it must be remembered that the inoculated person could give the disease in the unmodified form to others. People came from far and near to be inoculated, and eventually he built two more hospitals.

If a better procedure had not been discovered, we should undoubtedly be still using inoculation as a means of preventing the serious ravages of the disease. But in 1798, Dr. Jenner published in England the results of his experiments, which proved conclusively that smallpox could be absolutely prevented by inoculating a person with cowpox, the procedure that we now know as vaccination.

Vaccine virus was first brought to this country by Dr. Benjamin Waterhouse, a professor at the Harvard Medical School. On July 8, 1800, he vaccinated his seven children.

Dr. Aspinwall immediately began a thorough investigation of the new method which his friend and colleague, Dr. Waterhouse, was so strongly advocating. He tried the vaccine on his own patients and he had the children of Dr. Waterhouse come to his hospital where they were thoroughly exposed to smallpox without contracting the disease. At the conclusion of these experiments, Dr. Aspinwall heartily endorsed vaccination although it meant great financial loss to him, for he soon tore down his three hospitals.

After this the practice of vaccination spread rapidly over the civilized world, and since that time there have not been any serious outbreaks of the disease except where there were large numbers of persons not adequately protected by vaccination.

How thoroughly dependent we are on vaccination for our freedom from smallpox was well illustrated by the experience of Middleboro, Massachusetts, in 1929. There the law requiring the vaccination of school children had not been enforced in recent years, and as a result there were 223 cases of smallpox. Of these 221 had never been vaccinated and the other two had not been for over thirty years. The epidemic was promptly checked by vaccinating all of the inhabitants.

Smallpox is still a threat in every community, but we have a safe and effective method of keeping it out. *Let every one be vaccinated.—Bulletin Brookline Board of Health.*

CORRESPONDENCE

MEDICAL NEWS FROM CLEVELAND, OHIO*

The event for which the medical world of Cleveland is waiting impatiently is the opening of the new Lakeside Hospital. Due to have been dedicated on October first of this year, unavoidable circumstances have advanced the date to the first of next year. The history of this hospital, one of the foremost in the country, presents an unforgettable story. Founded during the Civil War as a Home for the Friendless, and incorporated in 1866 as the Cleveland City Hospital, it changed its name several times between that date and 1889 when, upon the building of a new municipal hospital, it became Lakeside Hospital. After several years of financial and legal vicissitudes the present buildings were opened in 1898. The hospital expanded until in 1926 it assumed its post as an important unit in the University Hospitals of Cleveland.

The new Lakeside Hospital forms the centre of a large group of medical buildings. Its construction was financed by a campaign in 1927 for six million dollars, an amount easily reached in a week. In the new building will be 160 beds devoted to surgery and the surgical specialties, and 120 beds set aside for the use of medicine and its specialties. There will be a few private beds for the use of the full-time staff, and the rest of the clinical staff will use the Hanna House, a separate pavilion for private cases of about 100 beds. There will be laboratories, a student amphitheater, and all modern x-ray equipment. The dispensary will be the first in Cleveland to be open all day. Grouped around the hospital are now the Maternity Hospital, Babies and Children's Hospital, Medical School, Dental School, Medical Library, and Power House. Added to these and in course of construction or finished are a Nurses' Dormitory, a private hospital mentioned above, and a Pathological Institute. The result will be a monument to medical advancement, a true Mecca for medical knowledge.

The director of administration will be Frank E. Chapman, previously director of Mt. Sinai Hospital since 1915. He succeeds Dr. Karl H. van Norman who recently resigned after five years of service.

The Cleveland City Hospital has in the past few years made rapid strides in gaining and maintaining an enviable position. Construction work nearing completion at the present time includes many things.

Further expansion of the nurses' home forms a new unit which completes an entire square. In this new building are 129 rooms for nurses and on the ground floor level, linen rooms, storage rooms, etc. There is also a new auditorium seating about 950 people, which, in case of emergency, may be combined with the gymnasium increasing the capacity to 1500. There have been additions to the dining rooms, alterations in the kitchen, and the installation of an elevator.

To the north end of the administration building has been erected a new four-story house officers' dormitory with 61 rooms for doctors. Included in this building are handball courts, a billiard room, and a

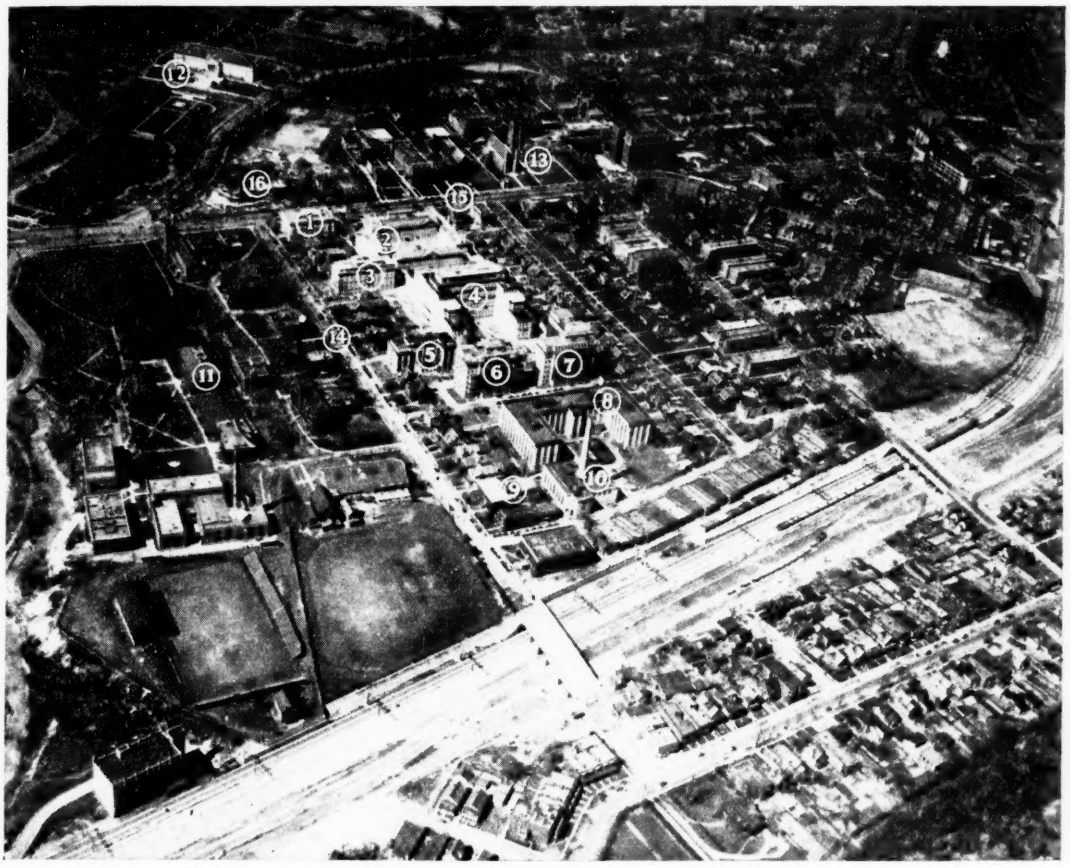
*From our special correspondent.

large living room. The fourth floor is on the same level as the third floor of the administration building making the capacity for doctors about 90 beds. At the south end of the administration building there is to be constructed a wing similar to the doctors' quarters, which will be devoted to pharmacy. Many of the drugs used in the hospital will be manufactured in this modern laboratory.

The largest piece of construction is the addition of the upper six floors to the Psychopathic Building. This addition will give 150 more psychopathic beds and 210 beds for chronic cases. The present ground floor will be altered to add space for the hydro-, electro-, and light therapy and occupational therapy divisions. The addition of these beds will increase the hospital capacity to 1450 beds.

At the coming fall election a bond issue will be proposed for a new tuberculosis sanatorium of 250 beds to replace the present antiquated structure. If this is passed the last old building will have been replaced and a hospital, modern in every way, will serve the citizens of Cleveland.

There have been few staff changes of importance. The appointment of a new surgical chief-of-staff, a position made vacant by the death of Dr. King Hamann, dean of Cleveland surgeons, will be announced the first of the year.



1. Allen Memorial Library.
2. Nurses' Dormitory.
3. Hanna House.
4. Lakeside Hospital.
5. Pathological Institute.
6. Babies and Children's Hospital.
7. Maternity Hospital.
8. Western Reserve Medical School.
9. Western Reserve Dental School.
10. Power Plant.
11. Western Reserve College for Men and Case School of Applied Science.
12. Cleveland Art Museum.
13. Western Reserve College for Women.
14. Adelbert Road.
15. Euclid Avenue.
16. Symphony Hall.

In the center of the photograph is shown the new Lakeside Hospital and the Western Reserve Medical School with their surrounding buildings. To the left of this great center are the buildings of the College and those of Case School of Applied Science (11). Across Euclid Avenue and in the left background is the Cleveland Art Museum (12). Just in front of it in the photograph is the new home of the Cleveland Symphony Orchestra (16). In the right background is the College for Women, an integral part of Western Reserve University. The legend locating the other buildings is self-explanatory.

VISIT OF DR. KLINE TO EUROPE

Dr. Benjamin S. Kline, associate professor of pathology at Western Reserve University, and chief of laboratories at Mt. Sinai Hospital, spent the month of August in Europe demonstrating his test for syphilis. The proponents of this test, designed to replace the Wassermann reaction, claim for it more accuracy, greater sensitivity, and more speed in technique.

THE CLEVELAND CLINIC

The building which was the scene of the Cleveland Clinic disaster has finally been remodeled and is being

used for administration purposes. It was feared at the beginning that the volatile material deposited on the walls at the time of the disaster would make the building unsuitable for further use. Researches, carried out principally by Dr. Allen Graham, have shown the fears to be groundless.

WESTERN RESERVE MEDICAL SCHOOL

The opening of Western Reserve Medical School brings with it other activities of importance to the medical world. An addition of note to the faculty is James Angus Doull, M.D., from Johns Hopkins Medical School, who comes to take the chair of the Department of Hygiene. Many meetings have been and will be held, mainly in connection with the Cleveland Academy of Medicine. On September 19, 1930, at the Annual Meeting of the Fifth District Ohio State Medical Association, the program was devoted entirely to the relationship between old age and disease processes. September 25, 1930, the twenty-third Hanna Lecture will be delivered by Franz Knoop, Professor of Physiological Chemistry at the University of Tübingen, his subject being "On the Significance of the Intermediary Metabolism."

Under the auspices of Western Reserve University and the Brush Foundation on October 17-18, 1930, a Symposium on Adolescence will be held. The list of speakers is not yet complete. Still later on during the Christmas holidays the American Association for the Advancement of Science will hold its annual meeting in this city.

RECENT DEATHS

LAPHAM—Dr. George Nelson Lapham, Assistant Professor of Diseases of the Chest in Boston University School of Medicine and a specialist in tuberculosis, died at Carroll's Sanatorium, Rutland, September 30, 1930, at the age of 58.

The son of the Rev. John B. and Mary Greenleaf Lapham he was born at Richmond, Maine, and received his early education there. He was graduated from Boston University School of Medicine in 1909 and had practiced in Rutland and Boston since.

He was a Fellow of the Massachusetts Medical Society and of the American Medical Association.

ROOT—Dr. Richmond Barbour Root, a retired Fellow of the Massachusetts Medical Society, died at his home in Georgetown, September 2, 1930, after a practice lasting 62 years.

A native of Byfield, where he was born May 27, 1847, he was educated at Dummer Academy and at Harvard Medical School where he received his M.D. in 1867. The next year he settled in Georgetown and was physician to that town and to Boxford, Groveland and Topsfield, being called often to Haverhill. He had a busy life as a family practitioner. At one time he was medical examiner of the 6th District of Essex County.

One instance in his career, illustrating both the wide span of his professional life and the almost traditional way in which families clung to him, if not wholly unique, could at any rate not be surpassed. About six years ago he attended the birth of an infant, both of whose parents he had brought into the world some twenty-five years before. The mother's mother he delivered twenty-five or more years before that. In the home where this grandmother was born, he attended her father and mother, her grandmother and grandfather, and she said that she could remember as a little girl, his coming to see her great-grandmother in her last illness. Here is a record of attendance upon six generations in the same family, three of which he had delivered.

Dr. Root is survived by his son, Dr. Raymond R. Root of Georgetown, a Fellow of the Massachusetts Medical Society.

NOTICES

BOSTON PSYCHOANALYTICAL SOCIETY

A Boston Psychoanalytical Society has been organized. The object of this society will be the study, investigation, and advancement of the science of psychoanalysis in its theoretical, therapeutic, applied, and cultural aspects.

The society will have monthly meetings. The officers elected were:

President, Dr. Isador H. Coriat.

Secretary, Dr. Martin W. Peck.

Council, Dr. Julia Deming and the President and Secretary ex-officio.

ANNOUNCEMENT

Dr. Earl J. Wylie has taken over the office and practice of the late Dr. Oscar S. Creeley, 128 Mt. Auburn Street, Watertown, Mass.

REPORT AND NOTICES OF MEETINGS

THE DISCUSSION OF DISSEMINATED SCLEROSIS BY SIR JAMES PURVES-STEWART

A special meeting of the Boston Society of Psychiatry and Neurology was held in the Boston Medical Library at 8:15 P. M., Tuesday, September 23, 1930. The record reading being dispensed with, Dr. E. W. Taylor, president, introduced the distinguished speaker of the evening, Sir James Purves-Stewart, of London.

The subject of the address was "The Etiology and Treatment of Disseminated Sclerosis." The speaker urged that his paper be looked upon only as a preliminary report, which he hoped had opened up new and significant lines of research in the subject. He pointed out that Disseminated Sclerosis is one of the most widespread neurological diseases, being exceeded in frequency only by syphilis of the central nervous system, and, in epidemic times, by poliomyelitis.

The diagnosis is based on clinical and serological findings. Of the latter, the gold curve is positive in 77%, the Wassermann negative, and there is an excess of globulin in 40 per cent. The progress of the disease is relentless, irregularly progressive, leaving permanent disability, and sometimes blindness. Death is from intercurrent infection. Alleged cures in the past are attributed to errors in diagnosis, and unusually long remissions.

The treatment was discussed from two angles: drug and specific. Hitherto drug treatment only has been available and arsenic is the most powerful agent yet used, especially in the form of silver salvarsan. The use of exogenous vaccines is still sub judice.

In regard to specific treatment, the microbic origin of the disease has been foretold by many. A summary of the work in this respect was given by the speaker; all of it has failed of substantiation. In 1927, the speaker's colleague, Miss Chevassut, cultured an organism from the cerebrospinal fluid of patients suffering with disseminated sclerosis. She has obtained positive cultures from 93 per cent. of a series of 269 cases, and negative cultures from all other types of disease. Fairly early in the investigation cases were encountered in which no organism could be found. These patients had been taking arsenic and positive cultures were obtained three weeks after discontinuance of this treatment.

The technique of this work is very exacting and difficult. The organism, spherula insularis, is a spherule of 0.7 microns diameter, about the size of a staphylococcus. It can only be studied with an ultramicroscope, under dark field, with mercury lamp illumination. It grows by the budding off of small granules (a process illustrated by lantern slides) and can be subcultured on a proper medium. A discussion of the cultural characteristics was fully given.

In vitro, experiments were reported suggesting action of the spherula in hydrolyzing brain lipoids. In vivo inoculation experiments with monkeys were reported with suggestive but inconclusive results.

The discovery of a viricidal substance in inoculated animals and patients during remissions, led to the attempt to prepare autogenous vaccines from the cerebrospinal fluid of victims of the disease. These vaccines were prepared and killed with 0.5 per cent. phenol. They were then given in repeated series of progressively increasing doses. Only 82 cases have been followed over a two-year period or longer. These are examined every three months, both clinically and serologically.

The interpretation of results depends on a classification of the cases into early, moderate, and advanced cases. Of 16 early cases, repeated cultures were negative in 10, gold curve and globulin diminished in 15, and almost complete clinical recovery was noted in 15. Of 32 moderately advanced cases, 9 cultures were negative, and clinical improvement was noted in 27. Of 34 advanced cases, one culture was negative, and 10 showed slight clinical improvement. By virtue of the morbid anatomy of the disease, cure must mean an arresting of the process, rather than a complete restoration of lost function.

Interpretation of these results must be made with due regard to the factors of suggestion, and spontaneous remissions. In these instances the serological reactions remain unchanged, according to the speaker.

Discussion was led by Dr. Zinsser, who pointed out the danger of misinterpretation of artefacts, cultural reactions, and neurological symptoms in caged monkeys.

Dr. Frank Fremont-Smith has found that gold curves and globulin become negative in spontaneous remissions.

Dr. James B. Ayer was impressed with the clinical results.

Drs. Tracy J. Putnam and E. W. Taylor found the neuropathology inconsistent.

The speaker reëmphasized some of his points.

CENSORS' MEETING

The Censors of the Suffolk District Medical Society will meet for the examination of candidates at the Medical Library, No. 8 The Fenway, Thursday, November 6, 1930, at 4.00 o'clock.

Candidates should make personal application to the Secretary, and present their medical diplomas at least one week before the examination.

LELAND MCKITTRICK, *Secretary.*

205 Beacon Street, Boston, Mass.

THE NORFOLK DISTRICT MEDICAL SOCIETY

A stated meeting of the Society will be held in the Long Island Hospital October 28, 1930. Telephone Granite 1371.

This will be in all respects a special meeting. Two years ago our Society met in this institution and the program which was prepared for us by the Staff proved so profitable, interesting and entertaining that those who attended still continue to comment upon it. In consideration of this and the fact that a great many were unable to attend that meeting, your Executive Committee has arranged for another.

Institutions Commissioner Maguire and the Staff of the Long Island Hospital have been exceedingly kind to us and have arranged a program which will eclipse that of our former meeting and which is complete in every detail. It will be unique in that no particular branch will receive exclusive attention. There will be an operative clinic and the subjects represented in demonstrations and talks will at least include medicine, surgery, neurology and orthopedics.

Program:

4:30 P. M.—First boat leaves Eastern Avenue wharf. Ample parking facilities on the wharf.

5:15—Operative clinic conducted by members of the Staff. Ward visits for those not desiring to stand by.

5:30—Second boat leaves Eastern Avenue wharf.

6:00—Short business meeting.

6:30—Supper.

7:30-9:00—Demonstration of cases and short papers by the Staff. Speaking time will not exceed 15 minutes, each speaker.

9:30—Boat leaves Long Island for Eastern Avenue wharf to arrive 10:00 P. M.

Attend and enjoy this wonderful program!

FRANK S. CRUICKSHANK, *Secretary.*

47 Bay State Road.

ATLANTIC DERMATOLOGICAL CONFERENCE

There will be a meeting of the Atlantic Dermatological Conference at the Massachusetts General Hospital Skin Out-Patient Department on Monday, No-

vember 10, at 2:00 P. M. Clinical cases will be shown from two to three-thirty, followed by discussion at three-thirty.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

October 20-24—International Assembly of the Interstate Postgraduate Medical Association of North America. Detailed notice appears on page 291, issue of August 7.

October 20-31—Third Graduate Fortnight of the New York Academy of Medicine. Detailed notice appears on page 547, issue of September 11.

October 22, 23, and 24—The Annual Convention of the American Academy of Physical Therapy. Complete notice appears on page 498, issue of September 4.

October 27-30—The American Public Health Association. Detailed notice appears on page 659, issue of September 25.

November 10—Atlantic Dermatological Conference. See page 801.

March 23-27, 1931—Fifteenth annual clinical session of the American College of Physicians. Detailed notice appears on page 790, issue of April 17.

July 27-31, 1931—Third International Congress of Radiology, Paris. Complete notice appears on page 385, issue of August 21.

DISTRICT MEDICAL SOCIETIES

Bristol North District Medical Society

April 16, 1931—Taunton Woman's Club.
September 17, 1931.

Franklin District Medical Society

November, 1930-May, 1931—The meetings are held on the second Tuesdays of November, January, March and May at 11 A. M. at the Weldon Hotel, Greenfield.

Hampden District Medical Society

October 21, 1930—Regular Fall Meeting at the Springfield Academy of Medicine, 20 Maple Street, Springfield, Mass., at 4:15 P. M.

Middlesex East District Medical Society

October 22—Joint meeting with Middlesex North and Essex North and South at the Veterans Hospital, Bedford.
November 12—New England Sanitarium and Hospital, Stoneham.
January 14, 1931—Harvard Club of Boston.
March 11, 1931—At Reading.
May 13, 1931—At Wakefield.

Norfolk District Medical Society

October 28—See page 801.

Suffolk District Medical Society

November 6—Censors' meeting. See page 801.

BOOK REVIEWS

A Compilation of Culture Media for the Cultivation of Micro-organisms. By MAX LEVINE, Ph.D., and W. H. SCHOENLEIN, M.S. Pp. xvi + 969. Williams & Wilkins Co., Baltimore, 1930. Price $15.00.

This volume, the second Monograph in Systematic Bacteriology, was prepared at the request of the Society of American Bacteriologists and financed by a grant from the Digestive Ferments Company of Detroit. Directions for preparing about 7000 culture media are given. Thanks to an ingenious system of classification, these are reduced to about 2500 formulae, the remainder being listed as variants of an earlier type of medium. In addition to directions for preparation, there are noted the use for which the medium was recommended and the reference to its source. Indices list the various media by name, constituents, use, and author.

The real value of such a work can only be determined after long use. It is obvious, however, that it should prevent the description as new of media which have previously been published. It also makes readily available directions for making media which are infrequently used or which may be unknown to bacteriologists undertaking a new line of investigations. The grouping together of directions for media which are essentially similar should prove of great value in pointing out modifications which have been successfully tried and which may be more useful under local conditions than would be the original formula.

No claim is made that all proposed formulae have been included in this volume, but the reviewer is willing to hazard the opinion that important omissions are extremely few. The various indices enable one to locate desired formulae with very little trouble, and the directions are clear. All who have participated in the preparation and publication of this work deserve the thanks of bacteriologists everywhere.

The Gold-Headed Cane. By WILLIAM MACMICHAEL, M.D. New edition with introduction and annotations by George C. Peachey. The Macmillan Co., New York, 1930. xix + 195 pages. Price, $6.50.

The history of the gold-headed cane is too well known to need repetition. It is sufficient to recall that it was carried by three important English physicians, Radcliffe, Mead and Baillie, and by two of lesser merit, Askew and Pitcairn, finally coming to rest in the College of Physicians, London, where it now reposes. The details of its peregrination in the hands of five medical men were first set down by William Macmichael in 1827. His small book, now much prized by collectors, required a second, enlarged edition the next year. This was such an improvement on his first efforts that all the subsequent editions have been reprints of it; the William Munk edition of 1884 with additions and notes, the Packard-Osler edition of 1915 (re-issued in 1920), and lastly, the present edition of 1923, illustrated and splendidly annotated by a good English scholar, George C. Peachey. The latter is to be remembered for his book on "William and John Hunter" and his "History of St. George's Hospital". The present issue is merely the English 1923 edition with an American imprint on the title-page. It lacks, naturally, the biography of Macmichael by Packard in the Hoeber issue of 1915, but one is amply compensated by the scholarly notes ot Peachey, the beautiful illustrations and the splendid form in which the book is produced. The date on the title-page is a little deceiving and the price seems unreasonably high, when one considers that the issue appears to be one of the original publisher's "remainders".

Radiologie Clinique Du Tube Digestif. Published under Direction of PIERRE DUVAL, J.-CH ROUX and HENRI BECLERE. 389 Pages. 330 francs.

This work covers the digestive tract and its associated glandular structures. The stomach and duodenum have formed the subject matter of a previous publication by authors of the same school.

The two volumes, very carefully bound and printed, are abundantly illustrated with clearly reproduced

radiographs to all of which are attached tracings and brief descriptions. They are complete in every detail and presented in brief and pleasant form.

The treatise is more the general consideration of clinical radiologic syndromes and signs than the enumeration of specific pathological entities and signs. The first chapter on the oesophagus illustrates the method of presentation. The principal methods of examination are briefly described and discussed. The authors then outline the physiology of the passage as it can be observed by x-ray. Then, are successively considered the varying pictures produced by the anatomical anomalies, the functional disturbances, the pathological lesions producing stenosis or other altered anatomical appearances. This is fairly closely followed in their study of the small and large intestines.

Considerable space is devoted to the diagnosis of hepatic and biliary affections, emphasizing the diagnosis of vesicular disease by the use of plain plates and the careful search of the stomach, duodenum and hepatic colon for what they term parabiliary signs. The use of dyes is given its place, however, though the intravenous method is looked upon as a measure of some gravity, to be used only in the exceptional cases where other methods have failed.

Les Actualites Physiotherapiques. Edited by Dr. DUHEM. II. Radiotherapie, Vol. 3, La Radiothérapie pénétrante by Ledoux-Lebard and Etienne Piot. Paris; Gauthier-Villars et Cie, 1930. 80 pages. Price 15 fr.

The authors have produced in this little book a valuable elementary introduction to deep radiotherapy. The first chapter discusses the physical and biological basis for the use of the short wave radiotherapy and demonstrates by very simple and easily understood mathematical equations the problems which must be met. As in the use of short wave radiation the object is always to gain as much penetration as possible to the deep-seated tumor with the least damage to the skin, the authors have pointed out the various factors which, from the physical nature of radiation, work against this and show how the ideal depth dose may be attained.

The second chapter deals with the technique of therapy, points out the dangers to the operator and to the patient, and discusses the unsatisfactoriness of the present method of measuring the depth dose.

The third chapter briefly sketches the electrical and special apparatus which would be required for deep therapy.

The last chapter takes up the various forms of cancer and points out the technique and dosage to be given in each case. Finally, there is a brief discussion of non-cancerous diseases which the authors believe deep therapy can improve. This subject is one upon which American radiologists would probably take issue with the authors. In general, however, it would be a helpful and valuable little book for the radiological house officer to read over at the beginning of his training.

The Chest. Annals of Roentgenology—Vol. XI. By L. R. SANTE, M.D. Paul B. Hoeber, Inc., New York. Price $20.00.

This book is volume eleven of the *Annals of Roentgenology*, published by Paul B. Hoeber, Inc., and edited by James T. Case; it contains 561 pages and 523 illustrations, and is perhaps the largest and most complete of the series.

The method of presentation which the author has selected is well adapted to a book of reference but necessitates a large amount of repetition. The subject matter is divided into three parts. In the first, the anatomy and physiology of the chest, the methods of examination and roentgen interpretation are discussed; in the second, the roentgen evidence of diseases of the chest in general are described; in the third, the roentgen findings in the various diseases are taken up in detail.

The second part of the book contains a number of diagrams presenting in a graphic manner, not only the densities which appear in the lung fields, but also the displacements of the heart and mediastinal contents with the position of the diaphragm as they occur in the various lesions. A study of the diagrams should help to clarify one's knowledge of the physiology and pathology of the chest. The chapter on tuberculosis in part three is very good—the findings in childhood as well as those in adult life are described.

Taken as a whole the book is perhaps the most complete radiological text in English.

Report on Fifth International Congress of Military Medicine and Pharmacy. London, England, May 1929. By WILLIAM SEAMAN BAINBRIDGE, M. C.-F. United States Naval Reserve. Member of Permanent Committee, Delegate from the United States. Composed, printed and bound by the Collegiate Press. George Banta Publishing Company, Menasha, Wisconsin.

This little volume of 154 pages, with many illustrations, gives an interesting résumé of the Fifth International Military Congress on Medicine and Pharmacy.

The first contributions to the Congress are on evacuation of the wounded by sea, and by air. New methods of caring for the sick and wounded, insuring greater facility and dispatch in the work by sea and by plane, are brought up and discussed at length.

The "Flying Ambulance," includes all planes that are able to accommodate a sick or injured person recumbent. Those fitted to carry four recumbent patients and a hospital orderly are the best type.

Interesting articles follow on "Tropical Fevers of Short Duration," and on "Injuries to Blood Vessels and Their Sequelae."

The book closes with an account of the "Physical and Chemical Analyses of the Class and Rubber Articles employed by Medical Services."

Rules for testing these most important adjuncts in the care of sick and wounded are given at length, and the extreme importance of the purity of such articles is stressed. This section of the report is naturally, from the nature of the subject, very technical, but is none the less interesting.

The conclusions of the Congress take up the last few pages of the report.

1. Evacuation of sick and wounded.

"Certain passenger or cargo boats should be designed, before construction for eventual use as hospital ships in war." Advice, in peace time, should be sought of representatives of the medical services of the various countries, concerning this matter.

2. Tropical fevers of short duration.

The extreme difficulty of diagnosis in such fevers of short duration is stressed.

Malaria frequently shows a low continued fever, the paroxysm being absent, and the parasites so scanty in the blood, as to be easily overlooked.

Abortive heat stroke accounts for some fevers of short duration in children, living in the tropics.

Weil's disease can be distinguished from yellow fever by the amount of albumin in the urine. In yellow fever a very large amount of albumin is present. In Weil's disease, only a trace of albumin is present.

3. Wounds of blood vessels.

The mortality is higher from war wounds than from similar peace time injuries.

The ultimate prognosis in these cases must be guarded.

Reconstruction operations and blood vessel suture can seldom be carried out in military surgery.

4. Analysis of glass and rubber articles.

The application of scientific knowledge concerning glass is gradually beginning to receive the attention it deserves.

Tests must be simple, so that they can be applied in an ordinary pharmacy.

Glass for laboratory articles and thermometers should be free from lead, and all red rubber articles should be free from arsenic and lead.

A number of illustrations of new methods of transporting the wounded, and single and group pictures of members of the Congress add interest to this instructive book.

Lecons de Physico-Cimie. By MM. BLANCHETIERE, DOGNON, FABRE, LESCOEUR, SANNIÉ, STROHL, WURMSER under the direction of A. STROHL. 1930. Masson et Cie, Paris. 282 pages. Price 40 fr.

This book is written for the medical profession and the biologists. It should appeal to many members of these two groups, first because it does not assume that the reader has profound knowledge of either physical chemistry or mathematics, and second because each topic is developed in a manner both lucid and interesting. The procedure in each chapter is first to point out the fundamentals of the topic under discussion, then to give the laws and theories, the methods of measurement used and finally examples showing the applications in biology and medicine, with their importance. The topics discussed include the atom and molecule, osmosis and cryoscopy, the ionic theory, kinetic chemistry, ionic equilibrium, hydrogen ion concentration, application of pH, the oxidation-reduction potential of cells, the liquid state, viscosity, optical properties of liquids and their biological application, colloids, catalysis and enzyme action. Three of the chapters have bibliographies and these include a few 1928 and 1929 references. The text contains occasional typographical errors but they are obviously oversights and therefore are not too confusing. One would like to see more references to facilitate the satisfying of an awakened interest in many of the applications of physical chemistry described. The book, however, will assist the reader toward intelligent reading of the rapidly increasing number of papers dealing with applications of physical chemistry to medicine and biology. The book has paper covers and includes no index.

Collected Publications From the Robert Dawson Memorial For Clinical Research and Preventative Medicine (Massachusetts Memorial Hospitals, Boston). Number One—Endocrine Studies. Boston, 1929. Privately Printed.

In this volume are collected the series of papers on endocrine studies which have recently appeared, largely in the *Journal of Endocrinology.* The volume represents the results of studying four or five thousand patients, many of whom were suffering from disorders of the internal secretions. It summarizes the data in this vast series of individuals and represents an enormous amount of work both in the laboratory and clinic. The patients were studied by a routine laboratory technic of great thoroughness, which forms the basis of the analyses of the diseases discussed. There has been a serious attempt made to summarize these results and the interest of these studies largely rests in the group response to various laboratory tests. As a result the book contains much interesting data as to the value of these laboratory procedures for diagnosis. There are also many interesting case reports. To those who are interested in the diseases of internal secretion this book is one from which much knowledge can be culled.

Clinical Features of Heart Disease. By LEROY CRUMMER, M.D., Emeritus Professor of Medicine, University of Nebraska. Published by Paul B. Hoeber, Inc., New York, 1930. Price $4.00.

This is a second edition, the first having appeared in 1925. Two new chapters have been added, one on acute rheumatic fever and the other on sub-acute bacterial endocarditis. Otherwise the text is a good deal like the first edition. Some corrections have been made, for whereas formerly aortic insufficiency was regarded as only due to syphilis, now rheumatic fever is included as one of its causes. The book is directed mainly at the general practitioner and certainly it can be said that none of the contents should be incomprehensible to him. It reads very easily and is written in a most simple and intelligible style. Although there are four hundred pages, because of the clarity of the print and the brevity of the text it can be read in one or two evenings. There is frequent reference

to our older clinicians and at times it seems that too little has been taken from the contributions of the past ten years.

The book, however, cannot be regarded as entirely authoritative, for there are frequent statements that are open to serious question and others that are by no means accepted by the leading workers in cardiology. On page 3 the author states, "We may realize that pneumococcic infections may be, and frequently are, the causative factors in diseases of the aortic valves . . . ." Later on page 181 he adds, "While acute articular rheumatism is generally given as the most frequent etiological factor, careful clinical observation will show that this opinion is fallacious. Simple aortic insufficiency usually develops during some form of pneumococcus infection and not during acute articular rheumatism." All published data carried on by careful observers lead one to believe that these statements are not true. There is no reported series of recovered cases of pneumonia in which the aortic valve was more than rarely if ever involved.

In a discussion of paroxysmal tachycardia, one paragraph on page 139 begins, "There is no definite treatment for the attack, nor is there any method of preventing recurrences." This was true in the older writings, but during the past decade or so we have successfully accomplished both treatment and prevention in many such cases. Quinidine and digitalis properly administered have been extremely valuable for this condition. On page 143 it is stated that quinidine should be used before operation to control the auricular fibrillation that is present in some cases of toxic goitre. It has been found by most observers, on the other hand, that whereas quinidine is generally ineffective while hyperthyroidism is still present, it is very helpful after operation if the fibrillation persists.

While discussing auricular flutter (page 157), there seems to be some confusion in the mind of the author, for it is stated that "intermediate rates never occur". There are on the contrary many cases of flutter in which the ventricular rate is irregular and not a simple fraction of the auricular rate. This is particularly true during digitalis treatment. Furthermore flutter is regarded by the author as being permanent, although transient cases do occur.

It is very doubtful whether many authorities will accept the following statement found on page 219, i.e., "Greater attention to the heart in all conditions in which pericarditis may be a complication is essential, since in cacodylate of sodium, Billings has found a specific when the disease is on a rheumatic basis."

There is also confusion in the discussion of heart pain as evidenced by the following, "When recovery takes place after the first attack of angina the patient lives in dread of a recurrence, and justly so, since death may occur in the next attack. When the patient survives a second attack, the original diagnosis must be called in question, and careful examination made to determine the source of error." This cannot refer to attacks of angina, although it is so stated, for patients may have hundreds of attacks of angina. If it referred to attacks of coronary thrombosis, some qualification in the statement would be necessary, as recovery from a second attack is by no means unheard of.

It is too bad that still another method of administering digitalis is outlined that "never gets beyond control and never produces any of the toxic effects of digitalis" (page 319). Most of us frankly admit that any method of administering digitalis that is to be effective will necessarily produce the symptoms and signs of toxicity in a small proportion of cases. Furthermore speaking about digitalis in auricular fibrillation (page 321) it is stated that "sudden reduction to 80 or below is an indication of overdosage". Not only is this not true in many cases, but often patients are in a better state of compensation with a heart rate between 60 and 70 than when it is over 80.

Apart from criticism such as above, there is much sound advice contained in this book. It emphasizes the simpler bedside aspects of heart disease, such as the wealth of valuable information that can be obtained from the proper history. It is unfortunate that lapses in information should detract from an otherwise valuable book.

The Nutrition of Healthy and Sick Infants and Children. By E. NOBEL, C. PIRQUET and R. WAGNER. Second Edition. Translated by B. M. Gasul. Published by F. A. Davis Company. Price $3.50.

This text is another exposition of the so-called Pirquet Nem System. This system was created during the War as an aid to feeding groups of impoverished infants and children in Europe. Later both European and American pediatricians have attempted to inaugurate the system with its special nomenclature into this country. For the most part the reaction of English speaking peoples is that in spite of the ingenuity of the system, there is no special advantage in or indication for supplanting the so-called caloric method of feeding.

For this reason the reviewer feels that the text is not to be recommended for the average practitioner or student of nutritional problems in children. The book does contain a brief but well arranged classification of the nutritional problem of pediatrics but makes no special contribution beyond that of our standard textbooks.

The Eleventh 1930 Revised Edition of Stedman's Practical Medical Dictionary. William Wood and Company. Price $7.50.

Stedman's is a complete standard American medical dictionary with a new revised edition this year and will be found especially useful to medical students and authors. The new Preface is particularly interesting, also the new Index of Tables and Index of Plates. There are seven new plates this year. Also extensive alterations and additions have been made to almost every one of the 1234 large pages.

Cavernous Sinus Thrombophlebitis. By WELLS P. EAGLETON, M.D. The Macmillan Co., 171 pages—17 illustrations.

No one in America is more competent to write of intracranial complications of ear, nose and throat disease than Dr. Wells P. Eagleton. This monogram on "Cavernous Sinus Thrombophlebitis" for the first time brings the subject matter into book form. From thorough and painstaking analysis of cases of the disease, the various routes of infection reaching the cavernous sinus are outlined. Eagleton is a stormy advocate of ligation of the internal carotid artery in conjunction with proper operative drainage of the cavernous sinus.

Osler's Principles and Practice of Medicine. Eleventh Edition. Revised by Thomas McCrae, M.D. D. Appleton & Co. 1930. Pp. 1237. Price $8.00.

Explanation for the appearance of a new edition of this textbook, to which students and practitioners of medicine have turned enthusiastically for nearly forty years, is quite unnecessary. Dr. McCrae has succeeded so admirably in maintaining the style and manner of presentation that it is difficult or impossible to pick out the new or rewritten passages from the text. Osler's textbook is still imbued with the spirit of its originator.

The new edition has many changes in content, and is thoroughly up to date in its attitude toward the recent developments of medical science. An impressive list of additions and revisions is found in the preface. So far as general arrangement is concerned, no striking alterations have been made, and it is amazing how sound were the original classifications. The historical data, the case tabulations, the pathological analyses, and the typical "Osler presentation" are still outstanding and can be duplicated nowhere else. With the addition of the new data to the old foundation, a readable modern survey of medicine is again available.

Though many feel that the day of the one-man textbook is waning, it is hoped and prophesied that students will continue to "turn to Osler" for many years to come.

BOOKS RECEIVED FOR REVIEW

Aphasia in Children by Alex. W. G. Ewing. Published by Oxford University Press. 152 Pages. Price $3.50.

Practical Midwifery for Nurses by Bethel Solomons. Published by Humphrey Milford, Oxford University Press. 354 Pages. Price $2.75.

Dosage Tables for Röntgen Therapy by Friedrich Voltz. Translated from the Second German Edition. Published by Oxford University Press. 120 Pages. Price $2.50.

Clinical Pediatrics: Published by D. Appleton & Company.

Volume 19. Diseases of the Genito-Urinary System in Infancy and Childhood by Henry F. Helmholz and Samuel Amberg. 239 Pages. Supervising Editor—Royal Storrs Haynes.

Volume 20. Laboratory Pediatrics by John D. Lyttle. 189 Pages. Supervising Editor—Royal Storrs Haynes.

Volume 21. Composite Index and Cumulative Supplement. 385 Pages.

Grow Thin on Good Food by Luella E. Axtell. Published by Funk & Wagnalls Company. 336 Pages. Price $2.00.

A Text-Book of Histology by Alexander A. Maximow. Completed and edited by William Bloom. Published by W. B. Saunders Company. 833 Pages. Price $9.00.

Diseases of the Skin by George Clinton Andrews. Published by W. B. Saunders Company. 1091 Pages. Price $12.00.

A Compilation of Culture Media by Max Levine and H. W. Schoenlein. Published by The Williams & Wilkins Company. 969 Pages. Price $15.00.

Nervous Indigestion by Walter C. Alvarez. Published by Paul B. Hoeber, Inc. 297 Pages. Price $3.75.

Outline in Obstetrics for Nurses by F. W. Rice. Published by The C. V. Mosby Company. 228 Pages. Price $2.00.

Riders of the Plagues by James A. Tobey. Published by Charles Scribner's Sons. 348 Pages. Price $3.50.

Arterial Hypertension by Edward J. Stieglitz. Published by Paul B. Hoeber Inc. 280 Pages. Price $5.50.

Stalkers of Pestilence by Wade W. Oliver. Introduction by Theobald Smith. Published by Paul B. Hoeber Inc. 251 Pages. Price $3.00.

The Candiru by Eugene Willis Gudger. With a foreword by Aldred Scott Warthin. Published by Paul B. Hoeber Inc. 120 Pages. Price $1.50.

History of Haitian Medicine by Robert P. Parsons. Foreword by Edward R. Stitt. Published by Paul B. Hoeber Inc. 196 Pages. Price $2.25.

Intestinal Tuberculosis by Lawrason Brown and Homer L. Sampson. Second Edition. Published by Lea & Febiger. 376 Pages. Price $4.75.

The Pathology of Diabetes Mellitus by Shields Warren. Published by Lea & Febiger. 212 Pages. Price $3.75.

A Treatise on Orthopaedic Surgery by Royal Whitman. Ninth Edition. Published by Lea & Febiger. 1085 Pages. Price $10.00.

Obstetrics by J. Whitridge Williams. Sixth Edition. Published by D. Appleton and Company. 1157 Pages. Price $10.00.

Monographs of The Rockefeller Institute for Medical Research. No. 23, August 15, 1930. The Treatment of Human Trypanosomiasis with Tryparsamide by Louise Pearce. Published by The Rockefeller Institute for Medical Research. 339 Pages.

United Fruit Company, Medical Department. 18th Annual Report. 1929. 451 Pages.

Studies from The Rockefeller Institute for Medical Research. Volume 71. Published by The Rockefeller Institute for Medical Research. 609 Pages.

Minor Surgery and Bandaging by Gwynne Williams. 20th Edition. Published by F. A. Davis Company. 445 Pages. Price $3.50.

Epidemiological Essays by F. G. Crookshank. Published by Kegan Paul, Trench, Trubner and Company Ltd. 136 Pages. Price 7s. 6d. net.